THE REVIEW

DEVOTED TO THE INTERESTS OF THE AMERICAN SOCIETY FOR METALS

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Measurement Of Hardness Is Discussed

Indentation Methods Are Low in Cost and Provide Check On Other Properties

By J. W. McBean

Ontario Chapter — The December meeting had a bumper attendance at the Royal York Hotel in Toronto.

After the dinner a movie of our great annual Field Day was repeated for the benefit of those who had not seen it the previous month.

A suggestion was made that the educational program, instead of being a single lecture course as in the last two years, might consist of a number of subjects taken up by smaller groups who would be interested in some special line, each group to have a leader. A call was made for a prompt expression of preference by letter to assist in deciding what form the program would take.

The technical paper on "Some of the Methods Employed in the Measurement of Indentation Hardness" was given by Vincent E. Lysaght, sales manager of the Wilson Mechanical Instrument Co. of New York.

The speaker gave a brief review of the various methods of measuring hardness previous to 1900, and then described more fully the Brinell method, the Scleroscope, Monotron, and Rockwell.

The indentation methods not only provide a low-cost means for determining hardness, but also serve as a useful check on other physical properties, such as tensile strength, and on heat treatment.

Indentation Tests Non-Destructive

While giving this useful information, they do not produce any serious damage to the material, so that the present production testing of aircraft and motor car parts can be applied to practically every piece, whereas ordinary test methods destroy the piece.

In some of the earlier indentation methods the size of the impression used was objectionable, especially for thin materials and for carburized or nitrided materials with a thin case, which gave inconsistent readings. In the development of the Rockwell method the size

(Continued on page 2)

Saginaw Valley Group of Detroit Chapter Expands

The Saginaw Valley Group of the Detroit Chapter, A.S.M., reports a membership grown to 95 with expectations of reaching 125 before the end of the season.

This group was formed last spring as a separate section of the Detroit Chapter. Regular monthly meetings are held in either Saginaw or Flint, Mich., serving members in northern Michigan who find it difficult to attend the meetings in Detroit.

The November meeting of the Group in Flint drew an attendance of 125, and C. M. Campbell, secretary of the Group, reports great interest among the metal workers of the Valley.

Atlantic City Chosen for Metal Congress

The Auditorium in Atlantic City Where the 19th National Metal Exposition Will Be Held Oct. 18 to 22, 1937, is an Imposing Structure Facing the Ocean.

Atlantic City has been selected by the Board of Trustees of the American Society for Metals as the location of the 19th National Metal Congress and Exposition which will be held Oct. 18 to 22, 1937.

This will be the first time the convention has been held in Atlantic City.

The $15,000,000 Auditorium will provide ample facilities for the National Metal Exposition. In addition to an ideal exhibition floor, 20 meeting rooms are available in the Auditorium.

Hotel accommodations in this resort town are, of course, of the best.

New Yorkers Hold Special Meeting to Greet New Officers

By F. H. Clark

New York Chapter—A special meeting was called on Nov. 16 to welcome E. C. Bain, A.S.M. national president. The members were also fortunate in having present all of the officers and trustees of the Society with the exception of G. B. Waterhouse and W. F. Woodside.

C. E. MacQuigg of Union Carbide and Carbon Research Laboratories acted as technical chairman and introduced the speaker, Col. C. T. Harris of the Ordnance Department, U. S. Army, who spoke on "Strategic Materials."

Manganese Is U. S. Import

In event of war, according to Colonel Harris, the United States might be faced with serious shortage in certain strategic materials necessary to carry on. Chief among these is manganese ore, ferro grade. About 14 pounds of metallic manganese is used in every ton of steel poured.

Today high grade manganese ore comes from Russia, India, the Gold Coast of Africa and Brazil. In time of war, probably one-third of the manganese necessary could be produced in the United States, but only at great expense.

Colonel Harris stated that other metals not mined to any large extent in this country are chromium and nickel, used in alloy steels, and tungsten in high speed steel. In the latter case, molybdenum may tend to replace tungsten since its supply is fully adequate.

Tin and antimony are two other metals which can be classed as strategic materials that are lacking in the United States.

Gill Presents Tool Steel Lecture for Notre Dame Group

Posters and Display of A.S.M. Publications Attract New Members

By Walter C. Troy

Notre Dame Group—James P. Gill, Campbell Memorial Lecturer for 1936, presented his lecture on "High Speed Steels" on Nov. 11.

Immediately before the meeting a display of all the periodicals available to members in the course of a year, accompanied with appropriate posters, evoked considerable interest from non-members attending the lecture.

During a brief review of the history of steel, Mr. Gill disclosed the surprising fact that the use of steel for purposes other than tools is a relatively recent development, dating from the introduction of the Bessemer and Siemens-Martin processes.

Tool steels were logically divided into five groups determined by composition with respect to tungsten, chromium, and vanadium. In the interest of economy, several of these groups are modified by nominal molybdenum contents which largely replace the tungsten.

Four series of excellent photomicrographs provided a concise explanation of the relation between drawing temperature, time at temperature, and a resultant grain size. The distinct increase in grain size resulting from four or five minutes extra time at hardening temperature indicated the delicate control necessary to heat treat these steels.

Following a brief outline of the function of cobalt in tool steels, Mr. Gill convinced his audience that the proper application of these steels is of prime importance.

Nitriding of some tools, such as dies or punches, effects distinctly improved performance, while in other applications surface hardening has no noteworthy advantages.

Review Becomes Monthly

Starting with this issue, THE REVIEW *will be issued monthly instead of bi-monthly, thus affording fresher news and more complete coverage for the rapidly growing membership of the American Society for Metals.*

2 New A.S.M. Junior Groups Are Organized

Student Members Play Large Part in Chapter Activities

Two new student groups of the American Society for Metals are in process of formation.

Organization of the Michigan College of Mining and Technology Group in Houghton, Mich., with 21 members, has already been approved by the Board of Trustees.

A second group is now being organized at Virginia Polytechnic Institute, Blacksburg, Va., and under the leadership of H. V. White, assistant professor, Department of Metallurgy, has already gathered together 11 memberships.

Officers of the Michigan College of Mining and Technology Group, who are all students at the College, are as follows: Arthur Eklund, Jr., chairman; Edward J. Egan, Jr., vice-chairman; J. Leon Gittlen, secretary-treasurer. Harold L. Walker is faculty adviser.

The success of such student groups, made up mainly of junior members, is perhaps best exemplified by the Notre Dame and Penn State Groups of the Society.

Notre Dame Becomes Chapter

The Notre Dame Group was organized in 1928 at the instigation of Dr. E. G. Mahin, head of the Department of Metallurgy, Notre Dame University. Always a small group, consisting mostly of junior members, it nevertheless took an active part in the affairs of the Society and held regular monthly meetings for which noted speakers were secured.

During the past few years its membership has grown and expanded until it now includes as many regular as junior members. It has therefore been advanced to the status of a chapter by the Board of Trustees, acting at the meeting on Nov. 20.

Growth At Penn State

The comparatively young Penn State Group was granted a charter on Aug. 14, 1934, on presentation of a petition signed by 27 metallurgical students at Pennsylvania State College. In the short space of 2½ years, its membership has grown to 37 junior and 12 regular members. The Group plays an active part in the biennial Pennsylvania inter-chapter meetings, and the metallurgical interests of the Central Pennsylvania district have been immeasurably furthered.

Student groups have also been organized as separate divisions of the regular chapters.

A Case Group and a Fenn College

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M. R. HYSLOP.....*Managing Editor*

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Indentation Tests Are Discussed at Meeting in Toronto

(Continued from page 1)

of the impression has been kept down to very small limits, even in the standard machines.

It is claimed that the use of the initial minor load makes it possible to use a surface which is not highly polished without appreciable error, and that the final minor load, keeping the same stress on the material as the initial load, minimizes errors due to springing of the materials under load.

Some of the precautions and auxiliary appliances necessary to secure accurate and rapid results were taken up.

Precautions Necessary

For instance, the surface tested should be horizontal. There must be no shift while the test is being applied. A change in speed of application would in some cases affect the result, and to avoid spring due to irregularity of the under surface, a very small supporting surface is used.

In testing thin work the impression should not show on the reverse side of the work, and experiments show that the thickness of material should be not less than ten times the depth of the impression.

Some have supposed that, when a thin piece is supported by a harder or softer surface, the error can be eliminated by using two or more thin pieces of the same material, but this is not so.

"Superficial" Rockwell Developed

For use on thin material and material with a thin hardened skin, there has been developed a "superficial" type of Rockwell machine. It has also proven more useful on very narrow surfaces, since the impression is very small.

It is also a better machine for testing accurate gages where the impression is so small as to do little damage to the accurately finished surfaces.

In the discussion of Mr. Lysaght's talk, a great many questions were answered by the speaker.

An interesting and amusing example of the difficulty of getting completely consistent results was mentioned by one of the members. If a piece of rubber is subjected to indentation with a moderate load, no noticeable impression is left. This would suggest that the material must be extremely hard, but, of course, the indentation method means nothing in this particular example.

Stainless Steel Broadens Its Market Is Title of Talk at Rhode Island Meeting

C. C. Snyder, Sales Engineer, Republic Steel Corp., Lists Fields For Applications of Stainless Steels

By Walter M. Saunders, Jr.

Rhode Island Chapter—"Stainless Steel Broadens Its Market" was the title of a talk by C. C. Snyder, sales engineer, Republic Steel Corp., which followed the presentation of the sound film "Enduro Stainless Steels," at the meeting on Nov. 4.

C. C. Snyder

After a preliminary discussion of the industries affected by corrosion, the historical background of stainless, and the types of stainless steels, Mr. Snyder listed the fields for broadening uses of stainless.

In the textile industry consumption has grown from a total of 15 to 20 tons in 1930 to close to 1000 tons in 1936, equivalent to a million dollars.

Streamlined trains will use as much stainless steel in 1936 as the entire production of 1926 in this country.

In the medicinal field the use of stainless steel for pharmaceutical equipment is growing rapidly. Mr. Snyder described particularly a large installation of 18-8-SMO for the processing of insulin used in treating diabetes.

A unique application in hospitals is for cages to house small animals used for experimental and research work. Twenty tons of 18-8 has gone into this market.

Stainless steel is becoming a very large factor in cooking utensils. One concern that produced 1500 pieces of cooking utensils in six months of 1932 is now producing the same number of pieces daily.

On the Mississippi Revetment Project stainless steel of high tensile strength is being used for reinforcement in the concrete mattressess and for fasteners for tying the mattressess together.

Both the very interesting motion picture and Mr. Snyder's talk showed how stainless steel seems to be invading many fields unthought of only a few years ago.

Washington Chapter Has Special Fund to Provide For Educational Program

An enrollment of 112 in the Washington Chapter lecture course was reported by the Educational Committee at the regular chapter meeting on Nov. 9. This number was far in excess of expectations.

W. M. Corse, chairman of the Chapter, also received a report to the effect that some local companies wished to support the educational program and had offered funds to assist in meeting the expenses of the program.

A resolution was read and adopted to use these funds solely for educational work and a special fund was therewith created to insure continuance of the educational program in the future.

Membership in the Washington Chapter has jumped from about 95 last year to approximately 175. This new membership has been gleaned largely from the ranks of those who signed up for the educational program.

Buffalo Has Lecture Course

By B. L. McCarthy

The Buffalo Chapter is again presenting an educational course. The Grossmann lectures are the basis for instruction.

The following men are presenting the course: M. L. Frey, service metallurgist, Republic Steel Corp.; I. E. Jacobs, assistant engineer of tests, Bethlehem Steel Co.; W. H. Blocksidge, metallurgist, J. H. Williams & Co.; and R. C. Spencer, metallurgist, Bliss & Laughlin, Inc.

The lectures are being given on Tuesday nights at the Hotel Buffalo. Leon H. Nelson of Republic Steel Corp. is Educational Committee chairman.

Transactions Index Ready

An index to Vol. XXIV of Transactions, covering the four quarterly issues in 1936, has been prepared and is available to members of the Society at no charge on request to the National Office, 7016 Euclid Ave., Cleveland.

Boston's Course Comprises Three Series of Lectures

Three series of lectures will comprise the educational course being presented by the Boston Chapter starting Jan. 6.

All three are based on courses presented at the annual Metal Congress, textbooks and lantern slides being supplied by the National Office of the American Society for Metals.

J. P. Gill's 1934 course on Tool Steels will open the series. These lectures will be presented by A.S.M. Vice-President George B. Waterhouse, professor of metallurgy at M.I.T. Mr. Gill himself will be present to conduct the last lecture of the series on Feb. 3.

This will be followed by H. D. Churchill's course on Physical Testing presented at the 1936 convention, which will be given by H. C. Mann, senior materials engineer, Watertown Arsenal.

Dr. L. R. Van Wert of Harvard University will finish the course by presenting M. A. Grossmann's 1935 lectures on Principles of Heat Treatment.

The lectures will be held at Massachusetts Institute of Technology every Wednesday evening and will be free to members of the A.S.M. They are under the direction of A. L. Knight, Wheelock, Lovejoy & Co., Cambridge, Mass., who is chairman of the Boston Chapter Educational Committee.

Gears Discussed by Peters

By Earl V. Peterson

North West Chapter—The largest turnout of the season listened to an excellent lecture on gears by Robert J. Peters of the Warner Gear Division, Borg Warner Co., on Nov. 10.

Mr. Peters covered the subject thoroughly; his discussion included the history and development of gears, hardening, carburizing and cyaniding practice, steels, and gear failures and their causes.

Absolute uniformity of the steel used is essential when manufacturing gears on a production basis. Improvements in steel making practice, however, and close cooperation with the steel makers have minimized this problem.

The lecture was illustrated by slides.

GLEANINGS From the Chapters

No Forgotten Men

The number of "big-wigs" scattered plentifully through the A.S.M. membership who take an active part in Society affairs is a matter of great pride to the organization. No forgotten man, however, is the fellow at the foot of the ladder—the junior member.

His value to the Society as well as its value to him is attested by the rapid strides being made by junior groups. (See headlines on page 1.)

Meet the Boys

This column cordially welcomes the new M.C.M.T and V.P.I. Groups (sorry but the alphabet rage finally got us) and hopes to hear a lot from them in the future.

Growing Pains

At the same time the Notre Dame Group comes of age and takes on the status of a full-fledged chapter. Our gossip editor tells us that E. G. Mahin is extremely proud of the Chapter's recently acquired sustaining member—the National-Standard Co. of Niles, Michigan.

More power, Professor!

Pigs Is Pigs

New Jersey Chapter greatly missed the presence of National Secretary Eisenman at its first smoker in December and hereby serves notice that the next invitation will be sent five months in advance.

It seems that Bill had a previous engagement out in Peoria which added to his fame as an after-dinner speaker but did little to enhance his prestige as a gentleman farmer—as those who heard his story about the willing sow will bear witness.

Fruits of Victory

From New Jersey also come reports of an outstanding success scored by the fall educational course with an average attendance of 125 members.

Hats off to H. W. Highriter who did a splendid job!

Real Help

In Washington the educational program made such a hit that some of the local firms have offered funds to help meet expenses. A resolution was promptly adopted to use such funds solely for future educational work.

No Charge, Harry

Those who are wondering why Harry Pulsifer has been wearing such a satisfied expression for the past month may now assuage their curiosity . He won the free dinner at the December meeting of the Cleveland Chapter.

Why Sustaining Members

Then there is Bill Long up in Worcester who is said to be seriously considering applying for a sustaining membership ever since he heard that the Chapter is to entertain the sustaining members as dinner guests at the April meeting.

Final reports have not yet come in but we believe an unsurpassed collection of wisdom and experience surrounded the speakers' table on Jan. when all living charter members of the Worcester Chapter were similarly honored.

Christmas Spirit

The philanthropic spirit of William J. deMauriac is truly appreciated in the Philadelphia Chapter. Cash contributions to its library fund such as his are indeed welcome.

Corrosion Theory, Precautions And Tests Explained by LaQue

American Chemical Society Joins in Meeting With Los Angeles Chapter to Consider Various Aspects of Corrosion

By Louie W. Mosley

Los Angeles Chapter—A joint meeting was held with the American Chemical Society's local chapter on Nov. 5, at which a dinner was served to approximately 250.

Dr. D. S. Clark, chairman, introduced A. G. Zima, Los Angeles representative of the Development & Research Division of the International Nickel Co., who spoke of the seriousness of the problem of corrosion, and, in turn, introduced F. L. LaQue, also with International Nickel Co.

Mr. LaQue's Subject, "Corrosion of Metals," was one of particular interest to both societies present.

His discussion covered the theoretical aspects of the subject, the factors that influence corrosion, and some precautionary and corrective measures that can be taken.

Corrosion Films of Varying Types

Films of corrosion products are of varying types, some readily removed, thus providing no protection against corrosion, and some strongly adhering to the surface of the metal, preventing further corrosion.

However, high fluid velocity across metallic surfaces often increases corrosion greatly by removing protective film coats.

Galvanic corrosion was explained and discussed. A little known but very important corrosion phenomenon relating to chromium alloys was mentioned, it being shown that chromium as a corrosion inhibitor depends upon whether it is in the active or passive state.

Mr. LaQue cited an instance which showed the necessity of great care in experimental and research work and illustrated a fact not widely known.

A shipbuilding company, contemplating the construction of a pleasure yacht with corrosion resisting metal plates attached to the frame with iron rivets, undertook some tests to determine whether these two materials in conjunction would be subject to corrosion in salt water.

Unexpected Corrosion Destroys Yacht

Their tests revealed that apparently no serious corrosion would result, and the boat was built at considerable cost. Shortly after the yacht was put in service, however, corrosion did set in and resulted in practically a total loss of the boat.

The explanation was that the tests had not taken into account the ratio of the areas of the two metals in contact. The area of the more noble metal was much greater than that of the less noble metal in the final combination, and under this condition corrosion proceeds rapidly.

Corrosion resisting metals will often corrode when unevenly subjected to a corroding medium. It is desirable that exposure to the corroding solution be as free or as bold as possible; otherwise corrosion will take place at apparently protected points, such as under U-leathers and packing glands.

Corrosion of Welds in Stainless

Mr. LaQue also explained the effect of welds on stainless steels, why corrosion sometimes occurs at the weld, and steps that may be taken to avoid this sort of corrosion.

Case hardening may have an accelerating effect upon corrosion, since the presence of a large percentage of carbon tends to increase corrosion.

In explaining the superior resistance of some metals under apparently the same climatic conditions which corroded other similar metals, Mr. LaQue remarked that the first oxide formed is the one which has the greatest subsequent influence upon the metal's surface. This oxide may have entirely different properties from the first oxide formed on another identical metal under very similar circumstances.

Technical Papers Invited

All members of the Society are cordially invited to submit technical papers to the Publication Committee for its consideration for presentation at the next annual convention, or for publication in Transactions, or both.

Information and suggestions for the preparation of manuscripts to be reviewed by the Committee will be sent upon request to the American Society for Metals, 7016 Euclid Avenue, Cleveland, Ohio.

Big Game Hunting and Steelmaking Films Seen

By Howard E. DeHaven

Detroit Chapter opened its at-home series of meetings with over 250 members and guests at dinner at Fort Shelby on Monday, Nov. 9. Six new members signed application blanks.

Preceding a talk on tool steel by Arthur F. W. Green, H. G. Batcheller, president of Ludlum Steel Co., presented some of his personal motion pictures of a big game hunting expedition in Alaska. These pictures were taken with a telescopic lens, many portions of the film being in color.

There were shots of the pure white mountain sheep, very difficult to obtain, and of the Kodiac bear in its rich brown coat. There were many views of game fishing taken in color. The Detroit group was particularly interested in the perfect streamlining of the dolphin, said to be the fastest mammal in the water.

Mr. Green, research engineer, Ludlum Steel Co., presented a film, partially in color, showing the operations in the production of tool and special alloy steels. He described the steel making practices as the film was shown.

At the conclusion of the talk, the technical chairman, J. M. Watson, past-president of the Society, led a lively discussion of the uses and properties of some of the steels which had been described in the making.

Gill Talks at New Jersey

By J. L. Auer

New Jersey Chapter—One of the Society's more famous members, J. P. Gill, of Vanadium-Alloys Steels Co., was speaker at the meeting on Nov. 9.

News of Mr. Gill's intended appearance spread like wild fire through the Chapter and resulted in a tremendous turn-out totaling around 300 members at the meeting following the dinner.

The members of associated chapters who have had the pleasure of hearing Mr. Gill know full well the splendid paper he presented on the subject of "Carbon and Low Alloy Tool Steels."

The discussion which followed his presentation was one of the longest and most interesting in the history of the New Jersey Chapter.

M.I.T. and Institute of Physics Sponsor Joint Conference on Metals

A conference on metals will be held on Jan. 28 and 29 at the Massachusetts Institute of Technology under the joint auspices of the Institute and the American Institute of Physics.

Cooperation in research will be the theme of the meeting, and the rewards of joint investigation of fundamental problems by physicists, metallurgists, and chemists will be discussed by leaders in these fields.

Many well-known members of the American Society for Metals will participate in the conference. Some of the papers to be presented are:

"Research Problems in the Steel Industry," by A.S.M. President E. C. Bain, United States Steel Corp.; "Inclusions in Ferrous Alloys," by A. B. Kinzel, Union Carbide and Carbon Corp.; "Flow Phenomena in Heavily Stressed Metals," by P. W. Bridgman, Harvard University; "Electronic Structures in Metals and Alloys," by J. C. Slater, Massachusetts Institute of Technology; "Corrosion," by J. R. Burns, Bell Telephone Laboratories; "Elastic Properties of Ferrous Alloys," by A. V. de Forest, M.I.T.; and "Chromium-Nickel-Iron Alloys," by V. N. Krivobok, Allegheny Steel Co.

Arrangements for the meeting are in charge of Professor John Wulff of M.I.T., who will act as secretary, and Dr. Harry A. Barton, director of the American Institute of Physics.

Columbia Plant Seen

American Manganese Steel Co. Is Also Visited by Chicago Members

By M. R. Wadsworth, Jr.

The Columbia Tool Steel Co. of Chicago Heights was host to the Chicago Chapter of of A.S.M. Friday afternoon, Nov. 20.

The entire plant was open for inspection and the visitors were at liberty to roam at will and ask questions freely. Numerous guides were available for the assistance of guests.

One of the features of the afternoon was the pouring of a heat from a 7-ton electric furnace and teeming the ingots.

The forge shop presented the hot working of tool steel on 1, 2, and 4-ton hammers. The efficiency and cooperation with which the work was carried out was of outstanding interest.

After visiting the laboratories at Columbia Tool Steel Co., the guests were conducted through the plant of the American Manganese Steel Co. (located across the street) where the manufacture of high manganese steel was in progress.

This trip included the pattern shops, molding and pouring procedures, and inspection of the X-ray laboratory.

Having followed the operations in alloy steel manufacture from molten steel to finished tool steel and castings, the members conceded that the tours of the afternoon were complete and the hospitality of the hosts unexcelled.

Forge Control Advances With Rapid Strides

Automatic Means Provide Close Precision in Process

By Hugh E. Brown

Cleveland Chapter—Evidently the subjects assigned to the third regular meeting held at the Cleveland Club on December 7 were of especial interest for 199 sat down to dinner and over 500 were in attendance for the main meeting later on.

Dr. Brooks Emeny, director of Foreign Affairs Council of Cleveland, gave the coffee talk, and in view of world conditions this was especially appropriate. He gave a splendid discussion of the pertinent facts concerning the countries of the world.

The technical session of the evening was in charge of Waldemar Naujoks, chief engineer of the Steel Improvement and Forge Co., as technical chairman. The speaker was R. W. Thompson, sales engineer, Transue & Williams Steel Forging Co., Alliance, Ohio.

Equipment and Steels Covered

Mr. Thompson gave a clean-cut and concise talk concerning forging practice, equipment for drop forging, upsetting, and similar operations. He also touched on steels best adapted for forging work.

Judging by what Mr. Thompson told us, it is evident that the forging industry has gone ahead tremendously in the last few years. It was brought out that the control over the forging operation is just about perfect as carried on today.

The heating of the steel is done by automatic means. The precision of the die work and, in fact, the whole process has been gone over and greatly improved during the last few years.

Movie Is Shown

All this was shown very nicely by a moving picture of the Transue & Williams forge shop which showed the entire operation from the unloading of the steel to the shipping of the finished forgings.

The Cleveland Chapter is certainly indebted to Mr. Thompson and his company for the very fine meeting they made possible.

The aerial views of Cleveland taken by H. H. Harris were distributed to the men who joined the Cleveland Chapter during the week of the National Metal Congress.

Among the guests present were R. M. Seabury, secretary-treasurer, Drop Forging Association; Assistant Secretary Kilborn, and a great many friends from the forging companies in the surrounding territory.

It has always been the history of the Cleveland Chapter that Forge Meeting Nights break records for attendance. Chapters desiring to boost their attendance might well look into Mr. Thompson's capabilities.

$2 Binds Your

• TRANSACTIONS

Members who wish to preserve Vol. XXIV of *Transactions* in bound form should send their copies to National Headquarters together with $2 which covers the cost of binding in blue cloth to match previous bound volumes.

If any member wants to keep his copies of the issues of Vol. XXIV, 1936, in loose form and yet have a bound volume for his library, a complete bound volume will be supplied for $5, postpaid.

Record of November Meeting of Board of Trustees in Cleveland

1937 Metal Congress and A.S.M. Educational Activities Given Detailed Attention; Committee Appointments Approved

Minutes of the Meeting of the Board of Trustees, A.S.M., Nov. 20, 1936, Cleveland, Ohio.

Present: E. C. Bain, G. B. Waterhouse, W. P. Woodside, W. H. Eisenman, R. S. Archer, R. L. Kenyon, S. C. Spalding, O. W. Ellis, R. L. Wilson.

At the request of President Bain, a statement was read indicating the duties of the Board of Trustees and the Secretary.

Functions of the Board of Trustees

To attend at least three meetings of the Board of Trustees as may be designated either by the Board or by the President.

Have final authority for election of founder and honorary members when presented on petition signed by ten or more members.

Final authority on granting of petitions for organizing chapters and groups.

May expel members of the Society by two-thirds vote after hearing and for good cause.

May fix the date on which all dues of members shall become payable.

Designate places for holding the annual meeting or special meetings.

Trustees may appoint other than the regular standing committees, fix their duties and remove them at pleasure.

The Board of Trustees may remove from office or membership on the Board any officer for good cause.

The Board of Trustees may pay salaries to such employees as it may find necessary, and also may pay the necessary expenses of officers, national committees and employees.

The Board of Trustees may require bonds for the members of the Finance Committee and other of its employees.

May designate the duties to be performed by the Secretary.

May designate such other duties as they may wish to be performed by the Treasurer.

The Board of Trustees may, in addition to the *Transactions*, publish and distribute such other publications and literature as it may determine.

May fix the price of subscriptions to its publications.

Appoint the following standing committees, to be appointed each year by the President and with the consent of the Board of Trustees, as soon as possible after the annual meeting:

Finance Committee
Publication Committee
Metals Handbook Committee
Constitution and By-Laws Committee

The Board of Trustees may initiate amendments to the constitution.

May amend the by-laws of the constitution by an affirmative vote of six members.

May not enter into a contract with any employee for services over a two-year period.

All matters of policy where there would be a pronounced effect upon the rights, privileges or services of the members are all put into effect through the authority of the Board of Trustees.

The Board of Trustees is the final authority on the selection of investments, although recommendations come to them from both the administrator and the finance committee.

The Board of Trustees is the final authority upon the compensation to be received by the employees of the Society, and while the salaries of many of the employees in minor positions may be adjusted from time to time by the Secretary, these adjustments are to be reported to the Board of Trustees for their approval.

Duties of the Secretary

To carry out the will of the Board.

To make such minor decisions as may be necessary from situations which arise from time to time in order to carry out the policy of the Board in what is considered to be the spirit in which the regulation was promulgated and for its most efficient and satisfactory accomplishment.

The Secretary takes care of all inter-office relationships, and in cooperation and consultation with the heads of the various units determines the most satisfactory method of accomplishment.

In the absence of the Secretary, these duties are performed by Mr. Bayless, Assistant Secretary, who upon all occasions knows where the Secretary is and can confer with him if there is any necessity to do so.

The Secretary secures approval from the Board of Trustees for the plans and arrangements for the general conduct of the Metal Congress and the Metal Exposition, and also such contributions, if any, that are made to cooperating societies. However, working out the general sales campaign for the exposition is a duty of the Secretary.

Upon motion by Trustee Archer, seconded by President Bain and unanimously carried, the minutes of the previous meeting of the Board of Trustees were approved as read.

Upon motion by Vice-President Waterhouse, seconded by Trustee Wilson and unanimously carried, the following appointments to standing committees, as recommended by President Bain, were approved:

FINANCE COMMITTEE

C. W. Heppenstall—member for 3 years
Bradley Stoughton—member for 3 years

PUBLICATION COMMITTEE

A. A. Bates—chairman for 1 year
V. N. Krivobok—member for 3 years
Earnshaw Cook—member for 3 years
John Chipman—member for 3 years
L. W. Kempf—member for 3 years

HANDBOOK COMMITTEE

J. P. Gill—chairman for 1 year
K. R. Van Horn—member for 3 years
R. H. Aborn—member for 3 years
Robert Schenck—member for 3 years

CONSTITUTION AND BY-LAWS COMMITTEE

G. J. O'Neill—chairman for 1 year
E. G. Mahin—member for 3 years
Kenneth J. MacKenzie—member for 3 years
S. C. Spalding—representing Board of Trustees

METAL PROGRESS ADVISORY COMMITTEE

President—E. C. Bain
Vice-President—G. B. Waterhouse
Secretary—W. H. Eisenman
Assistant Secretary—R. T. Bayless
Editor—E. E. Thum
Zay Jeffries—member for 1 year
T. C. Fetherston—member for 1 year
R. A. Wheeler—member for 1 year
R. G. Guthrie—member for 1 year

Financial Report Presented

Treasurer Woodside then presented the report of the meeting of the Finance Committee held November 19, which recommended:

That the savings account at the Cleveland Trust Co. should be increased to approximately $2000.00.

That the reserve for doubtful accounts should be increased from $500.00 to $1000.00; and that the reserve for obsolescence of book inventory should be increased from $3000.00 to $4000.00.

That the balance sheet as submitted by the auditors, Ernst & Ernst, for the year ending August 31, 1936, should be approved (printed in December *Transactions*).

That the advertising accounts receivable, showing practically only current accounts, due the Society, should be approved.

That the inventory of the Society should be approved, and that in the opinion of the Committee the books had been charged into the inventory at a reasonable price.

That the Committee conferred with Mr. Heydt, representative of the Cleveland Trust Co., trustee of the Society's investments, with reference to the status of the present investments of the Society and also their recommendations for investment of an additional $10,000.00.

That the Finance Committee recommends the purchase of $5,000.00 Pennsylvania Railroad General Bonds, 4½, due in 1965, and $5,000.00 additional be equally invested in Incorporated Investors and Massachusetts Investors.

That the Committee recommends the approval of the income and expense account general for the year 1936 as submitted by the auditors, Ernst & Ernst (printed on page 1045, December *Transactions*).

That the budget for 1936-37 be approved.

Upon motion by Trustee Archer, seconded by Trustee Spalding and unanimously carried, the report of the Treasurer and the meeting and recommendations of the Finance Committee were approved, and the budget adopted.

Upon motion by Trustee Kenyon, seconded by Trustee Archer and unanimously carried, it was voted that the honorarium for the Campbell Memorial Lecture should be increased to $500.00.

Metal Congress Plans Made

Consideration was then given to the location of the 1937 National Metal Congress and Exposition. The Secretary presented an extensive report outlining the advantages and disadvantages of the three cities under consideration, Philadelphia, Atlantic City, and New York.

Upon motion by Trustee Archer, seconded by Trustee Kenyon and unanimously carried, it was voted that Atlantic City should be selected for the 1937 convention and exposition of the Society to be held the third week in October.

The next topic considered was the National Metal Congress for 1937 and the Secretary presented the following report, which was approved:

Invitations should be extended to the following societies to cooperate in the 1937 National Metal Congress:

Iron & Steel Division and Institute of Metals Division, American Institute of Mining and Metallurgical Engineers
American Welding Society
Wire Association
American Society of Mechanical Engineers

It is confidently expected, from conversations already held, that these groups will be with the Congress again.

Symposium Arranged

When the Publication Committee met in Cleveland early this year, they gave consideration to a symposium for the 1937 convention and decided that they would hold a symposium and that the subject should be "Carburizing and Decarburizing."

Chairman Sykes of the Publication Committee will soon appoint a subcommittee to lay out the general program for this symposium, and we will proceed immediately to secure the authors for the various papers of the symposium.

It is proposed that the Publication Committee will have a meeting in Cleveland on Dec. 18, at which general plans for the coming year will be perfected and immediately after the holidays invitations will go out to authors to prepare papers for the 1937 convention.

At this meeting there will be presented to the Publication Committee the resolution as prepared by the Rochester Chapter, and an endeavor will be made to have them assist, if they can, in the solution of this problem.

Simultaneous sessions were held this year for the first time, and while one may not wax enthusiastic about them, nevertheless they had in attendance those who were most interested in the subject.

The symposium this year was on the "Plasticity of Metals." It was quite successful, and there was a heavy demand for preprints of the papers.

Sykes Is Campbell Lecturer

Wesley Pope Sykes has already been selected by the Board to deliver the 1937 Campbell Memorial Lecture, and probably at the spring meeting of the Board consideration should be given to the selection of the 1938 lecturer.

The two educational lectures given at the congress this year were decidedly successful, as will be reported to you by Trustee Reid, and at this time we should probably give consideration to the topic and speaker, or topics and speakers, for the 1937 congress.

Trustee Kenyon, as chairman of the educational committee for the Cleveland convention, then presented a written report dealing with those activities.

Trustee Kenyon further supplemented his report by reading some of the very fine statistics that had been compiled by Dr. Kent R. Van Horn, director of the course, which dealt, among other things, with the registration, industries engaged in by registrants, positions of the registrants, points of highest education of the registrants, number of registrants, and suggested courses for succeeding years.

The Board then discussed the educational activities to be held at the convention for the coming year, and upon motion by Trustee Archer, seconded by Vice-President Waterhouse and unanimously carried, Trustee Kenyon was again appointed chairman of the convention educational program, with Dr. Kent R. Van Horn, the former course director, a member of the committee, one other member to be selected by Mr. Kenyon, who, after having heard and discussions and recommendations of the Board had made at this meeting was to have full authority to arrange the topic and the speaker or the topics and the speakers for the 1937 educational program at the Metal Congress.

Initiation Fee Considered

Following the instructions received from the Board of Trustees as recorded in the minutes of the previous meeting held during the convention at Cleveland, the following proposed amendment was submitted to the Board.

BE IT RESOLVED, That there be and there hereby is proposed the amendment of the Constitution of American Society for Metals by adding as the last section of Article I thereof the following, to wit:

"INITIATION FEE

"Section 8. The Board of Trustees may fix and from time to time increase, decrease or eliminate an initiation fee to be paid to the Society by the applicant in addition to annual dues and as a condition of admission to any designated class of membership. Such fee may differ in respect of applicants for different classes of membership, but shall never exceed $15.00, and may be apportioned between the Society and the local chapters in such manner and to such extent as may be determined from time to time by the Board of Trustees."

BE IT FURTHER RESOLVED, That the Secretary of the Society do and cause to be done all things necessary to cause the amendment so proposed to be duly submitted to the members of the Society at the next annual meeting or at a special meeting thereof, for the consideration and action of the members according to the terms of the Constitution, Article XVI.

As an aid in studying the amount expended by the A.S.M. per member and the effect of increased membership upon the cost per member, an analysis was submitted covering the years 192[illegible] to 1936 as follows:

Year	Expense	Av. No. Members	Av. Cost Per Member
1921	$ 51,343.75	1946	$26.40
1922	57,565.32	2241	25.75
1923	82,895.90	2530	32.80
1924	105,157.95	2886	36.40
1925	116,150.92	3200	36.30
1926	215,530.41	3682	58.50
1927	224,262.40	4327	51.80
1928	231,859.70	4749	48.70
1929	270,780.85	5230	51.80
1930	263,625.15	5877	44.90
1931	270,309.11	5949	45.50
1932	163,634.82	5115	31.90
1933	140,929.19	4469	31.40
1/34-8/34	92,706.26	4907	18.90
8/34-8/35	190,460.22	6162	30.90
8/35-8/36	234,367.06	7206	32.50

There was a free exchange of opinion among the members of the Board as to the necessity and advisability of initiating the proposed amendment, and upon motion by Trustee Kenyon, seconded by Treasurer Woodside and unanimously carried, initiation of the proposed amendment was laid on the table.

Educational Activities Reported

The Secretary reported and outlined in detail the large number of chapters that were engaged in educational activities and indicated that seven of the twenty-five courses to be presented during the present season were courses provided by the national headquarters.

The Secretary also presented the following report on educational activities:

The résumé just presented will indicate to the trustees that educational activities on the part of the chapters are forming a very important Society activity. From the statement made previously you are able to detect that the material available from the national office has served as a ground work for many of these courses, of which the most popular has been the Grossmann course.

The Churchill lectures are included in an educational course to be given by the Boston chapter starting

(Continued on page 10)

HERE AND THERE WITH A.S.M. MEMBERS

CAMPBELL Memorial Lecturer at the 1937 National Metal Congress, to be held in Atlantic City, N. J., next fall, will be WESLEY P. SYKES, metallurgical engineer, Cleveland Wire Works, General Electric Co., Cleveland.

W. P. Sykes

Bill, as he prefers to be called, can generally be counted on for a whacking good technical paper when occasion demands. Iron-tungsten and iron-molybdenum alloys are his forte.

For the past three years he has also been acting as a special lecturer at Case School of Applied Science.

* * *

A FOUNDATION for JOHN L. YOUNG'S new position as manager of machinery sales, United Engineering and Foundry Co., was obtained during an association of 14 years with Timken Roller Bearing Co.

Mr. Young has been with United since last February as service engineer in the sales department. His experience with Timken was largely as district manager in the Pittsburgh district, where he specialized in the application of roller bearings to steel mill equipment. For the year preceding his transfer to United, he was assistant general manager of the Timken Industrial Division at Canton.

Mr. Young was graduated from University of Indiana in 1921.

* * *

THE New Jersey Chapter is happy to announce that one of its very good friends and a member of its Executive Committee—E. W. JENKINS—who was seriously ill and confined to the hospital is now at his home and well on the way to recovery.

SECRETARY-TREASURER W. PAUL EDDY, JR., of the Detroit Chapter, A.S.M., is to prepare the American Foundrymen's Association exchange paper for the 1937 meeting of the French Foundry Technical Association.

Mr. Eddy is a graduate of Syracuse University (1922) and has been successively chemist at Crucible Steel Co. of America, assistant metallurgist and chief metallurgist at Geometric Tool Co., assistant metallurgist at Brown-Lipe-Chapin Division of General Motors, and, since 1930, chief metallurgist of the General Motors Truck Corp., Pontiac, Mich.

* * *

CLAYT CRONKRIGHT, vice-chairman of the New Jersey Chapter, has forsaken the ranks of the "Benedicts" and was happily married a few weeks ago.

* * *

A.S.M. Past-President JOHN MITCHELL WATSON has become associated with the Jones & Laughlin Steel Corp. district office in Detroit.

J. M. Watson

A graduate of University of Michigan, Mr. Watson has been for many years a metallurgical engineer of the Hupp Motor Car Co., Detroit, and previous to that of the Sheldon Axle Co., Wilkes-Barre, Pa.

"Mike" has been active not only in the A.S.M. (he was treasurer in 1928 and 1929, vice-president in 1930, and president in 1931), but also served as chairman of the Iron and Steel Division of the Society of Automotive Engineers from 1924 to 1930. He is also a member of the American Society for Testing Materials and the British Iron and Steel Institute.

INTERESTING experiences, new ideas, and a new degree of doctor of engineering were brought back by WELTON J. CROOK, professor of metallurgy at Stanford University, from a 15 months' leave of absence spent in Europe.

The degree was conferred by the Ecole Politechnique Roi Carol II in Bucharest, Rumania, where Dr. Crook spent about a year in study and research on steel making slags.

Dr. Crook is a faithful member of the Golden Gate Chapter of the Society, having served successively as vice-chairman and chairman during the years 1926 to 1929. He has devoted much time to the educational work of the Chapter and is the author of many papers and talks as well as of a book and set of charts entitled "Metallurgical Spectrum Analysis."

* * *

A.S.M. TRUSTEE O. W. ELLIS, director of research in metallurgy, Ontario Research Foundation, will present the American Foundrymen's Association exchange paper before the Institute of British Foundrymen.

Mr. Ellis, who was elected to the Board of Trustees last fall, received his technical training at the University of Birmingham in England, where he was born. His career has been spent in England and Canada with the exception of a few years as an industrial fellow at the Mellon Institute, Pittsburgh, and as research metallurgist, Westinghouse Electric & Mfg. Co.

* * *

THE Case Hardening Service Co., Cleveland, has elected JAMES S. AYLING to be secretary of the company. He will also continue in his position as sales manager.

A graduate of Syracuse University, he was employed by Peerless Motor Car Co. and Steel Improvement and Forge Co. before making his present connection about 15 years ago.

Mr. Ayling has long been active in the affairs of the Cleveland Chapter, having served as secretary-treasurer from 1927 to 1929, and as chairman in 1929-30.

* * *

AN ASSOCIATION of 17 years with General Electric Co. in the research laboratory, during which he made many valuable contributions to metallurgical research and literature, has been terminated by GERALD R. BROPHY, who now joins the Development and Research staff of International Nickel Co., Inc.

G. R. Brophy

He will be located at the research laboratory in Bayonne, N. J., where he will tackle problems relating to nickel steels, nickel cast irons and other ferrous materials.

AS a first step in broadening its scope of activities, the American Foundrymen's Association, at a meeting on Dec. 4, elected CHARLES EDGAR HOYT to the new office of executive vice-president.

C. E. Hoyt

Mr. Hoyt, who comes from a family of foundrymen and spent his school vacations learning the business, early became associated with the Foundrymen's Association and its predecessors. While employed on the faculty of Lewis Institute, Chicago, he also took an active part in the work of the Western Foundrymen's Association, the Chicago Foundry Foremen's Association, and the Associated Foundry Foremen of America.

When the A.F.A. was incorporated in 1916, Mr. Hoyt was elected a director and also manager of exhibits, a position he still retains. He resigned from Lewis Institute in 1917, and has been secretary-treasurer of the Association for the past 18 years.

* * *

A SOJOURN in the hospital did not seem to interfere with the fine service J. W. MCBEAN gives to the American Society for Metals in reporting the Ontario Chapter meetings.

He is now back on the job again in good shape to tackle new work, thanks to the combined effect of the operation and the rest.

* * *

C. W. HEPPENSTALL, president of the Heppenstall Co., Pittsburgh, and member of the National Finance Committee of the A.S.M., has accepted the chairmanship of the Advisory Board in Metallurgy of Pennsylvania State College.

This board will be associated with the college's well-known School of Mineral Industries. Mr. Heppenstall is an alumnus of Penn State, class of 1893.

† † †

A LONG period of ill health was terminated on Dec. 16 by the death of the noted metallurgist and educator, WILLIAM CAMPBELL, Howe Professor of Metallurgy, School of Mines, Columbia University.

William Campbell was born in England, of Scottish descent, in 1876. Primarily a scholar, his education was obtained at King's College, London; St. Kenelms College, Oxford; Durham University College of Science; and the Royal School of Mines.

At the turn of the century he came to the United States and settled at Columbia, where he obtained his Ph.D. degree in 1905, and where he has studied and taught ever since.

His supplementary activities and honors form a list of imposing proportions. They include metallographic work for U. S. Government departments; editorial direction of such organs as the International Journal of Metallurgy and the Journal of Industrial and Engineering Chemistry; memberships in numerous organizations including the A.S.M., the vice-presidency in 1911 of the New York Academy of Sciences, and the chairmanship for many years of the Committee on Non-Ferrous Metals and Alloys of the American Society for Testing Materials.

He was a member of the honorary societies Sigma Xi and Tau Beta Pi, and was awarded the Saville Shaw Medal of the Society of Chemical Industry, the Carnegie Scholarship of the Iron and Steel Institute, and a Research Grant of the Carnegie Institution.

Coonan on Nitriding

Practical and Academic Aspects Given; Christmas Party Follows

By Emerson S. Norris

Baltimore Chapter—One of the most interesting talks in some time was presented at the season's third meeting on Dec. 14. The speaker was Dr. Fred L. Coonan, professor of metallurgy, Post Graduate School, U. S. Naval Academy. His subject was "Some Practical Aspects of Nitriding."

Dr. Coonan kept his audience alert and interested by his clear delivery and proper balance of practical and academic viewpoints of the subject.

Starting with a discussion of the process of nitriding, he continued with the alloys used and the reasons for using them. He explained heat treatments, necessity of using stress and decarburization-free steel, nitrogen dissociation, containers, character of case, and corrosion.

Having done considerable work in the development of malleable cast iron suitable for nitriding, he described the difficulties encountered, especially in casting iron containing large percentages of aluminum.

An entertainment after the talk was presented as a sort of Christmas party. "Professor Norman" demonstrated numerous tricks of magic and kept the audience laughing with excellent ventriloquism. Professor Norman's "mystery lady" provided no small amount of amusement. However, she proved no great mystery as she left very little undivulged.

Nickel-Copper and Nickel-Iron Alloys Are Widely Used

By D. R. Howerton

Chicago Chapter—A dinner followed by tricks and illusions in black magic proceeded the lecture at the regular monthly meeting on Dec. 10.

Technical Chairman J. Walter Scott of the Western Electric Co. introduced the speaker of the evening, E. M. Wise, assistant manager of the research laboratory, International Nickel Co., Inc.

Mr. Wise was first active with the A.S.M. in Cincinnati. He continued his interest and work in the New York Chapter, of which he is a past chairman.

The subject of the address was "Nickel Alloys," in which the speaker dealt with the two alloy systems of wide practical importance and their more complicated derivatives — the nickel-iron and the nickel-copper alloys.

The first system provides a transition from the ferrous to the non-ferrous alloys and includes alloys possessing a wide range of interesting and unique properties.

The nickel-copper series and its derivatives, including the nickel-silvers, the nickel-bronzes, and some of the special monels, are not only broadly employed but are in many cases responsive to age hardening treatments and, therefore, may be particularly interesting to those engaged in the heat treatment of metals.

Watts Gives Second Lecture

By D. R. Howerton

At the second of the series of educational lectures of the Chicago Chapter, held at the Peoples' Gas Building on Nov. 5, Professor Watts of the University of Wisconsin gave an interesting lecture on corrosion of metals.

The importance of corrosion was emphasized and a very lucid explanation of the four general types of corrosion was given. Professor Watts also touched upon the use of inhibitors, passivity, film protection, pitting due to impurities or from external causes, and dezincification.

Free Literature — Mail Coupon Belo

Nickel Silver*
Riverside Metal Co. has just published a beautiful booklet on nickel silver. If you want the latest information on this subject, presented in an attractive, interesting manner, write for Bulletin Aa-156.

Fine Steels*
Compiled by men who make fine steels to assist men who use fine steels, a handy, pocket size, 150-page volume by Ludlum Steel Co. contains many new, helpful charts and tables, all made quickly available by a unique method of indexing. Bulletin Aa-94.

Forging Experience
The experience of 21 years has made National Forge and Ordnance Co. the headquarters for a host of basic electric steel products. Typical products and equipment for making them are described in a series of attractive pictorial circulars. Bulletin Dy-136.

Chain
Interesting information on chain and belt conveyors for use at high temperature may be had by sending for a new illustrated bulletin by Michigan Steel Casting Co. Bulletin Dy-84.

EPI Microscope*
The Zeiss EPI microscope for the illumination and observation of opaque material has unlimited applications for observing opaque material in dark field, bright field, and polarized light. A descriptive leaflet is published by Carl Zeiss, Inc. Bulletin Aa-28.

Brinell Tester*
Accurate and exact measurements can be made on hard or soft materials with the Diamo-Brinell hardness testing machine, which uses a pyramid-shaped diamond instead of a steel ball. Described in a pamphlet by Pittsburgh Instrument and Machine Co. Bulletin Aa-1.

Silver Solder*
Characteristics and uses of 12 standard compositions of silver solders meeting almost all requirements for this useful material are described in a folder by Handy & Harman, Inc. Bulletin Aa-126.

Carburizing Steel*
Union Hymo is a carburizing steel especially adaptable to gears and shafts and other parts requiring high wear resistance. Its special properties and applications are described in a folder by Union Drawn Steel Co. Bulletin Aa-83.

Tube Furnaces*
The uses, construction, control and operation of combustion tube furnaces are given in a folder by Hevi Duty Electric Co. which includes complete specifications for various types. Bulletin Aa-44.

Constructional Steels*
A reprint of a technical article by E. C. Smith, chief metallurgist of Republic Steel Corp., on "The Making and Shaping of Alloy Constructional Steel" is prepared for distribution by International Nickel Co. Bulletin Aa-45.

Thermometers*
A 72-page catalog by Brown Instrument Co. covers the complete line of Brown thermometers and pressure gages—indicating, recording and controlling—and enumerates the wide range of industries to which they are applicable. Bulletin Aa-3.

Steel Service*
"Steel Service" is the title of a bulletin which gives valuable information on testing methods and pickling control charts. It is distributed by the Grasselli Chemicals Department of E. I. du Pont de Nemours & Co. Bulletin Aa-29.

Liquitol
The use of Liquitol for controlled cooling of iron and steel castings and ingots is fully described in a bulletin by Alpha-Lux Co., Inc. Bulletin Mya-120.

Muffle Gas Furnaces*
Two models of Juthe muffle type gas furnaces for pre-heating, hardening and annealing, and for heat treating high speed steel are described in bulletins by American Electric Furnace Co. Bulletin Aa-2.

Cr Stainless Steels*
Complete information attractively presented on Enduro AA, S, S-1, and FC is contained in a booklet by Republic Steel Corp. Enduro AA is the 18% Cr steel, and S, S-1 and FC are of the 11 to 16% Cr type. Bulletin Aa-8.

Coordinated Control*
A new system, known as the Coordinated Control System, for automatically operating all of the technical operations and factors of an industrial process is described by the Bristol Co. Bulletin Aa-87.

Tocco Process
This amazing new and extremely accurate method of heat treating is described in a new four-page leaflet, yours for the asking. Distributed by Ohio Crankshaft Co. Bulletin Oy-145.

Spoilage Fear*
Fear of spoilage, says C. I. Hayes, Inc., may cost a firm more than actual tool loss through spoilage in the furnace. How "certain curtain" furnaces eliminate spoilage and spoilage fear is told in Bulletin Aa-15.

Liquid Carburizing
E. F. Houghton's Perliton liquid carburizer is the subject of a 23-page booklet. Depth of case, speed of penetration, and other results are well illustrated with graphs and photomicrographs. Bulletin Nv-38.

Screw Machining
Screw machine products of aluminum are treated in authoritative and extensive manner in a booklet of Aluminum Co. of America. Besides general data on screw machining, a number of very useful tables appear. Bulletin Ar-54.

Spectrographs
A new catalog has been prepared which gives complete details of the Bausch & Lomb line of spectrographs and accessories, from small units to the large Littrow spectrographs with "matched" accessories, to satisfy the most exacting needs. Bulletin Aya-35.

Heat in Industry
"Wherever Heat Is Used in Industry" is the title of Surface Combustion Corp.'s new booklet which starts with "Surface Combustion" principles and shows a part of various types of standard burners and furnaces and special furnaces. Bulletin Dx-51.

Tempering Furnace
Technical details and operating data on Lindberg Steel Treating Co.'s new Cyclone electric tempering furnace, which has shown a remarkable performance record in steel treating operations, are given in Bulletin Fx-66.

Compressor Data
General information on the application of blowers to gas and oil burners, and miscellaneous applications for other types of work are included in a 12-page "Turbo Compressor Data Book." Useful tables and charts are included. Spencer Turbine Co. Bulletin Dy-70.

Forging Presses*
High speed steam-hydraulic forging presses are especially adapted for working heavy forgings to the close degree of accuracy required in the heavy metal fabricating industries. Described and illustrated by many views in a bulletin by Chambersburg Engineering Co. Bulletin Aa-132.

Bright Annealing
Electric Furnace Co. tells about their controlled atmosphere furnaces for continuous deoxidize annealing, bright normalizing and annealing ferrous and non-ferrous metals. Work comes clean, bright and dry from these furnaces. Bulletin No-30.

Laboratory Service
A new edition of "The Metal Analyst" tells about an organization established by Adolph I. Buehler specializing in the installation of metallurgical laboratories. The complete line of laboratory equipment marketed by Buehler is also catalogued. Bulletin Dy-135.

Beryllium-Copper
Beryllium-Copper is a relatively new alloy produced by American Brass Co. which can be heat treated to tensiles as high as 181,000 lb. per sq. in. It is supplied in sheets, wire rods, tubes and forgings. An excellent booklet gives full information on fabrication and treating. Bulletin No-89.

Locomotive Steels
A comprehensive review covers specific applications, based on current practice, of various types of vanadium steels for locomotive and car construction. It contains 72 pages and is available to railway executives and engineers. Published by Vanadium Corp. of America. Bulletin Dy-27.

Silmo Steel
A series of six loose-leaf pages is available from Timken Steel & Tube Co. which gives complete physical data on "Silmo," a new steel especially designed for applications where an economical combination of high temperature strength and oxidation resistance is required. Bulletin Dy-71.

Light Case
Severe breakdown tests were run by A. F. Holden Co. to study the characteristics of Holden Light Case in relation to case penetration and the total change of chemistry of the bath. They are described, and a chart showing results is reproduced, in a folder ready for distribution. Bulletin Dy-55.

Rotoblast
A new blast cleaning machine eliminates the need for compressed air as the abrasive driving agent. Pangborn Corporation tells how a rapidly spinning wheel propels the abrasive by controlled centrifugal force. Bulletin Ox-68.

Rustproofing
How the Detrex method of solvent degreasing provides the advantages of speed, economy, and satisfactory cleaning before all kinds of rustproofing and finishing operations is pointed out in a leaflet by Detroit Rex Products Co. Bulletin Dy-111.

Capacitrol
An indicating control pyrometer is made by Wheelco Instruments Co., known as the Wheelco Capacitrol. Their bulletin gives full description, wiring diagrams for different furnace or oven installations, and price. Bulletin Mya-110.

Cutting Oils
The problems of machine tool lubrication engendered by the high speed production and close tolerances of modern industrial operations are discussed and progress in cutting oils during the past few years reviewed in a booklet by D. A. Stuart & Co. Bulletin Jyb-118.

Electric Salt Baths
Literature is available from Bellis Heat Treating Co. describing electrically heated bath furnaces which are economical to operate and have a wide range of applications in hardening, annealing, and heat treatment of high speed steel, stainless steel, nickel, aluminum, copper and bronze, etc. Bulletin Ny-48.

Machining Stainless
Don't let machining problems keep you from using stainless steel. A booklet by U. S. Steel Corp. contains full information on two types of stainless steels which can be easily handled on automatic screw machines for quantity production. Bulletin Ny-79.

Blowers
A folder devoted to the application of rotary positive blowers in foundry cupola service, issued by Roots-Connersville Blower Corp., discusses in detail the structural and operating features of these blowers. Bulletin Jyc-131.

Pure Metals
Pure, carbide-free metals are described and applications suggested in a pamphlet published by Metal & Thermit Corp., who make pure tungsten, chromium and manganese in addition to the ferro-alloys. Bulletin Mya-64.

Electric Heat
The certainty of results obtained with electric heat is economically available in automatically controlled electric furnaces. Hoskins Mfg. Co. has a catalog stressing the advantages and low-cost maintenance of their line of furnaces. Bulletin Jya-24.

Mo-Cr-Ni Forgings
A real text is presented by A. Finkl & Sons Co. on heat treated molybdenum-chromium-nickel steel forgings for heavy machinery. The illustrations and physical property tables and curves speak for themselves. Bulletin Mya-23.

Foundry Metallograph
Today's engineering cast irons are structure-controlled in the foundry. The E. Leitz simplified micro-metallograph MM-2 is particularly adapted to foundry applications. Bulletin Fy-47.

New-Series Recorders
Foxboro's new bulletin describes in detail the extra, compensating slide-wire—a feature found only in the Foxboro potentiometer recording pyrometers for industrial temperatures. All types are listed and illustrated in this booklet. Bulletin Myb-21.

Camera-Microscope
A highly efficient and up-to-date apparatus that is an ingenious combination of several instruments into one universal camera-microscope is described by Pfaltz & Bauer, Inc. in a handsomely printed booklet containing some intriguing photomicrographs. Bulletin Oy-142.

Port Valves
Diagrams and descriptive matter show the operation of adjustable port valves made by North American Mfg. Co. that are particularly suitable for mediums whose rate of flow is not constant. Bulletin Oy-138.

Electric Control
A complete new control system for regulating input in proportion to demand is described in "Micromax Electric Control," an illustrated eight-page catalog issued by Leeds & Northrup Co. Bulletin Oy-46.

Alloy Castings
Michiana Products Corp. has published a new book describing Michiana corrosion resistant and stainless steel alloys. Generously illustrated, it suggests many savings for the use of these alloys. Bulletin Oy-81.

Nichrome
"Nichrome" nickel-chromium resistance alloy is not the only product made by Driver-Harris Co. A new 68-page catalog gives complete data for this well-known material as well as a wide variety of other alloys. Bulletin Oy-19.

Ferro-Alloys
An interesting folder by Electro Metallurgical Co. tells all about their ferro-alloys and their special service to users which will help them to operate their furnaces and make alloy additions under the proper conditions. Bulletin Jya-16.

Testing with Monotron
Shore Instrument & Mfg. Co. offers a new bulletin on Monotron hardness testing machines which function quickly and accurately under all conditions of practice. Bulletin Je-33.

Torsion Impact
Baldwin-Southwark Corp. makes available a folder of technical information on their Carpenter torsion impact testing machine, showing how to operate it and indicating the types of investigation the machine will serve. Bulletin Ob-67.

Oven Furnaces*
In a nutshell American Gas Furnace Co.'s improved oven furnaces offer controlled atmosphere, quiet operation, economy, are over and under-fired and bottom vented. Described more fully in Bulletin Aa-11.

Specialized Tester
The Rockwell superficial hardness tester is a specialized instrument for use where the indentation into the work must be kept shallow or of small area, yet sensitivity preserved. A supplement to Wilson Mechanical Instrument Co. catalog on the regular Rockwell tester tells about it. Bulletin Sy-22.

Physical Testing*
The Riehle Testing Machine Division of American Machine and Metals, Inc., is prepared to furnish a thousand different kinds of testing machines, instruments and appliances to cover the whole field of physical testing. Representative types are attractively written up in Bulletin Aa-157.

New Recorder
C. J. Tagliabue Mfg. Co. announces for the first time in a new edition of their pyrometer catalog a new two- and three-position recording controller. The complete Tag line of indicating, recording, and controlling pyrometers, which utilize a beam of light, a mirror galvanometer and a phototube, is also described. Bulletin Ay-62.

Drop Forgings
An attractive and comprehensive book on drop forgings has just been published by the Drop Forging Association. The book deals with the characteristics, qualities and uses of drop forgings and is a valuable addition to the library of any one interested in this subject. Bulletin Aya-123.

Air-Clutch Forging
Two bulletins are offered by Ajax Mfg. Co. One tells about their air-clutch forging machine in 2 to 7-in. sizes, made according to the most advanced design. The second is concerned with the Ajax-Hogue wire drawer, an attachment for heading machines which presents new economies. Bulletin Ox-105.

Moly Cast Iron
The use of molybdenum in foundry practice both on steel and cast iron, is described in a handsome booklet by Climax Molybdenum Co. which presents accurate technical information in a striking and modern manner. Bulletin Jyc-4

Heat Treating Manual
A folder of Chicago Flexible Shaft Co. contains conveniently arranged information on heat treating equipment for schools, laboratories and shops, and also illustrates the several types of Stewart industrial furnaces. Bulletin Ar-49.

Recuperators
Results obtained with Carborundum Company's recuperators using Carbofrax tubes are fuel savings, closer temperature control, faster heating, and improved furnace atmosphere. Complete engineering data are given in Bulletin Fx-57.

Steel Handbook
A handbook has been prepared by Heppenstall Co. covering the effects of alloying elements and the physical properties of steel in forged sections. Such valuable data as heat treating definitions, McQuaid-Ehn grain size classification, hardness conversion tables, and physical property tables are included. Bulletin Jyb-122.

Newer Tool Steels
Vulcan Crucible Steel Co. has a complete and attractive catalog listing their full line of tool steels including many special types to meet the modern trends in industry. Bulletin Jyb-127.

Combustion Train
A highly efficient and practical combustion train for modern metallurgical laboratories is the Chevrolet Motors Type sold by E. H. Sargent & Co., dealers in laboratory supplies. It is described in Bulletin R-137.

Corrugated Ingots
The Gathmann Engineering Co. has published a new booklet called "Gathmann Ingot Molds—Their purpose and Design." It illustrates various corrugated ingot contours designed to produce defect-free surface in steel ingots. Bulletin Aya-13.

Nickel-Copper Steels
Exceptional resistance to corrosion and abrasion, increased tensile strength, and higher ductility are the qualities claimed for Youngstown Sheet & Tube Co.'s new series of Yoloy steels. A summary of properties and notes on their characteristics are contained in Bulletin Ox-93.

Heat Resisting Alloys
Authoritative information on alloy castings, especially the chromium-nickel and straight chromium alloys manufactured by General Alloys Co. to resist corrosion and high temperatures, is contained in Bulletin D-17.

Ni-Cr Castings
Compositions, properties, and uses of the high nickel-chromium castings made by The Electro Alloys Co. for heat, corrosion and abrasion resistance are concisely stated in a handy illustrated booklet. Bulletin Fx-32.

Sponge Iron
A Bureau of Mines report gives some interesting data on vibration damping capacity of steels made with Swedish sponge iron as raw material. Ekstrand & Tholand, Inc., has copies for distribution. Bulletin R-162.

The Laboratory
The latest issue of Fisher Scientific Co.'s interesting little magazine, "The Laboratory," containing articles of historical and practical value, may be had by sending for Bulletin R-133.

Cutting Steel
Recommended practices for gas cutting of structural steel are given in a concise and authoritative form by The Linde Air Products Co. Qualification tests for good workmanship from the standpoint of accuracy and smoothness of cuts are also described. Bulletin De-6

The Review,
7016 Euclid Ave., Cleveland

Please have sent to me without charge or obligation the following literature described in the January issue. Please order by number only. It is important to write in your company or business connection when you return this coupon.

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*New bulletins announced for the first time in this issue.

Students Take an Important Part in A.S.M. Activities

Discussion Meetings for Junior Members Are Projected

(Continued from page 1)

Group function as divisions of the Cleveland Chapter, with 38 students at Case School of Applied Science and 14 at Fenn College. Recognition of the value of such groups is planned by the Cleveland Chapter in the form of an annual dinner for the junior members, the first of which will be held in March.

Two members have also been appointed to the Executive Committee of the Cleveland Chapter as junior representatives, one from Case and one from Fenn College.

Juniors at Pitt, Detroit and Lehigh

The Pittsburgh Chapter has 45 junior members who are members of the Carnegie Institute of Technology Group, 36 junior members in the Detroit Chapter are students at University of Michigan, and Lehigh University also has a student group numbering 31.

Further recognition of junior members is being planned by some of the chapters with a rather sizable membership in this category in the form of discussion meetings which would be open to juniors only. Two or three senior members might be invited to help out at each meeting, but the purpose of the groups would be to give the younger men an opportunity for free discussion and interchange of opinion.

Membership Fee $2.50

Junior memberships are granted to those who are either students or are under 21 years of age. The membership fee is $2.50 per year instead of the regular $10 and entitles the member to all of the privileges of the Society except a vote.

Junior members receive all of the publications of the Society except the Handbook, which, however, may be had for the nominal sum of $2.50.

In this way the younger men in the metallurgical field are given the benefits of the Society at a cost commensurate with their income and financial standing, at a time when these benefits are of inestimable value.

The chapters having 15 or more junior members are as follows:

Peoria	112	Chicago	39
Detroit	57	Penn State	37
Cleveland	51	Columbus	33
Pittsburgh	48	Boston	31
Lehigh Valley	42	Notre Dame	19

Film Short Made Available

Movie of Iron and Steel Manufacture Can Be Had at no Cost

Audio Productions, Inc., New York, in cooperation with American Iron and Steel Institute, has completed production of an educational one-reel movie "short" depicting many interesting and dramatic phases of the manufacture of iron and steel from the raw material to the finished product.

The scenes were "shot" in a number of the large modern steel plants in various parts of the country.

A two-reel film of a similar nature is also being produced and will be made available at no cost for private showing before schools, clubs and groups of various kinds throughout the country.

Either of the films can be obtained by writing Audio Productions, Inc., 250 West 57th St., New York, or the American Iron and Steel Institute, 350 Fifth Ave., New York.

Officers of New Junior Group at Houghton

Arthur Eklund, Jr.

Edward J. Egan, Jr.

J. Leon Gittlen

Arthur Eklund, Jr., is chairman of the newly formed Michigan College of Mining and Technology Group of the American Society for Metals. Edward J. Egan, Jr., is vice-chairman, and J. Leon Gittlen is secretary-treasurer.

All are students at Michigan Tech and junior members of the Society.

The American Society for Metals is the latest of three professional groups at Michigan Tech to which metallurgists are eligible. The others are the student chapter of the A.I.M.E. and Alpha Sigma Mu, an honorary fraternity restricted to upperclassmen.

Metallurgy has played a prominent part in the curriculum of Houghton from the very beginning of Michigan Tech in 1886 as the Michigan Mining School. The granting of metallurgical degrees preceded by two years the expansion of the Michigan College of Mines, a decade ago, into a polytechnic institute. Tech now confers degrees in seven fields of engineering and three branches of science. In metallurgy it grants bachelors', masters', professional, and doctors' degrees.

800 Crowd New Jersey Chapter's First Smoker

By J. L. Auer

New Jersey Chapter's first Smoker, which was held on Monday evening, Dec. 14, at the Essex House, Newark, was an outstanding success.

The attendance of 800 members and guests was the largest gathering in the history of the Chapter, and was limited to this amount only because facilities at our disposal would not handle a larger number. As early as four days before the event all printed tickets had been disposed of.

The presence of former national presidents A. H. d'Arcambal and Ben Shepherd added prestige to the momentous occasion.

The gathering enjoyed a splendid dinner and worthwhile floor show, and partook in the distribution of 106 individual door prizes that had been contributed by generous members and friends of the Chapter.

Bain Satisfies Technical Appetites With Talk on Some Heat Treating Anomalies

By G. R. Fitterer

Pittsburgh Chapter—Probably the largest audience ever to attend a Pittsburgh Chapter meeting turned out on Nov. 12 to greet E. C. Bain as the new national president.

Following a summary of the standing of the Society by Secretary W. H. Eisenman, Bain spoke on "Some Anomalies in the Heat Treatment of Steel."

As a review of previous work it was pointed out that the hardenability may be changed by any alloy that will dissolve in the austenitic solid solution.

The grain size effect is also very important since the coarse-grained steels have a greater hardenability than fine-grained. After showing that he had developed different grain sizes in samples of the same steel by heating to different temperatures, Bain emphasized the point that the quenching temperature is not as important in hardenability as the coarsening temperature in its relation (above or below) to the heating temperature.

The present favored method of varying grain size by deoxidizing the steel with varying amounts of aluminum was mentioned. An example was shown in which a steel with 8 to 10 oz. of aluminum per ton (in ladle) failed to harden because of its very fine grain size.

An extremely interesting series of photomicrographs was shown which illustrated the diffusion of cementite into solid solution. Various boundaries were apparent so that in one sample cementite was surrounded by an envelope of about 1.5% carbon austenite in an island of martensite, which in turn was surrounded by a layer of pearlite and then the total enclosed in ferrite.

Another interesting point was the effect of the medium used for heating prior to quenching. Steels heated in deoxidized lead, oxidized lead, controlled atmosphere and air decreased in hardenability in the order mentioned.

Bain left little unsaid and the technical appetites of many were satisfied for the first time in months.

Crook Tells of Travel Abroad

Spent One Year in Rumania on Study of Steel Slags

By C. W. Horack

Golden Gate Chapter—First event on the program Nov. 16 following dinner was a review by Frank B. Drake of what he saw and heard at the annual National Metal Congress in Cleveland.

His impressions were brief but very interesting and covered the fine exhibits and technical papers making up the Metal Show and Congress.

Indeed, after hearing all the worthwhile things the Metal Congress had to offer, many of the members may have felt a little envious of those who had the privilege of attending.

Another chapter member, Dr. Welton J. Crook of Stanford University, was the main speaker of the evening.

Dr. Crook had just returned from a 15 months' leave of absence during which he spent about a year in study and research on steel making slags at the Ecole Politechnique "Roi Carol II" in Bucharest, Rumania. Upon completion of his work the degree of doctor of engineering was conferred upon him by this institution.

Having visited so many places on his journey to Bucharest, Dr. Crook chose to present an illustrated travel talk. He had many experiences to recount.

Arriving in Italy at the time the war with Ethiopia was started, he experienced considerable difficulty getting transportation out of the country.

Of considerable interest was his description of life in Rumania and particularly the organization of its educational program for training young men for the many economic and industrial problems resulting from the acquisition of new territory after the World War.

At the completion of his travel talk, Dr. Crook referred to a few of the problems arising from his study on steel making slags. This subject aroused considerable discussion, but as the regular time for adjournment had passed, the discussion could not continue.

The hope was expressed, however, that Dr. Crook would favor the Chapter with a special talk on his experimental researches on the mineralogical constitution and chemical action of steel making slags at some future meeting.

HEAT TREATMENT
and Metallography of Steel

Elements of Physical Metallurgy (*Second Edition*)

by HORACE C. KNERR, *Consulting Metallurgical Engineer*

Written especially for the Metallurgy Course conducted by the Philadelphia Chapter of A.S.M. at Temple University.

A comprehensive and condensed text and reference for the practical man, the student, engineer, salesman, executive.

This text thoroughly covers the fundamentals of physical metallurgy:

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Metallography	Heat Treating Methods
Pyrometry	Alloy Steels
Thermal Analysis	Equipment and Fuels

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Close Control Required for Spot Welding

Most Widely Used of Resistance Methods Is Featured in Talk by Larsen

By R. R. Kennedy

Dayton Chapter—The speaker at the November meetings of the Columbus, Cincinnati and Dayton Chapters was E. I. Larsen of the P. R. Mallory & Co. Mr. Larsen chose as his subject "Resistance Welding of Ferrous and Non-Ferrous Metals."

The different kinds of resistance welding were described. Flash or butt welding is a process in which the parts are clamped and brought together so that the current can flash between them and heat the ends to the welding temperature, after which pressure is applied to complete the weld.

In projection welding, small projections are raised on the parts to be welded, the parts are brought together with the current on, the projections are heated by the current and pressure is applied.

Seam welding consists of passing two overlapping sheets between disk type electrodes. The weld is not continuous but consists of a series of small spots very close together. Such welds can, however, be made pressure tight.

Spot Welding Rapid and Flexible

Spot welding, the most widely used type of resistance welding, consists of welding two parts together under pressure of two electrodes by current flowing between the electrodes.

This process is rapid and flexible. Spots may be made one at a time or in some specialized applications as many as 300 spots may be made in one welding cycle, although the spots are not made simultaneously.

Most metals and alloys may be spot welded. Pure metals of high conductivity are difficult to spot weld because they are likely to stick to the electrodes. By selecting the correct welding conditions, many dissimilar alloys may be spot welded.

Accurate Control Necessary

In order to produce sound and reliable spot welds, welding conditions must be closely controlled. Machines are now on the market in which the current, the pressure and welding time are all under accurate control.

The quality of the electrodes is of great importance. An electrode must have high heat and electrical conductivity, high hardness and a high recrystallization temperature. High electrical conductivity is necessary to prevent excessive heating of the electrodes and the heat developed must be rapidly conducted away from the electrode tips.

High hardness is desirable so that the electrodes will not deform under the pressure applied, while the electrode material should have a high recrystallization temperature since rapid plastic flow takes place if this temperature is exceeded.

Experiments on Electrodes

Mr. Larsen described a series of experiments he has conducted to determine the suitability of various materials for use as electrodes. They included pure copper, copper-tungsten, copper-cadmium and copper-chromium alloys.

The tests consisted of welding 0.040-in. steel sheet under carefully controlled conditions and measuring the rate of deformation of the electrode tips. The results of the experiments indicate that the copper-chromium alloys give the best results.

Mr. Larsen closed the talk by citing successful applications of spot welding. Of greatest interest was the statement that the average automobile contains about 3000 spot welds.

Lincoln Plans Arc Welding Foundation

Fund Voted by Lincoln Electric Co. for Welding Research

The Lincoln Electric Co. has completed its long-contemplated plans for establishing a fund and foundation to encourage study and research for the benefit of the welding industry.

In honor of the pioneer work of the company's president in promoting arc welding and perfecting and developing arc welding equipment and electrodes, this new fund, which was recently voted by directors of the company, has been named "The James F. Lincoln Arc Welding Foundation."

Principal direction of the Foundation's work will be given by Dr. E. E. Dreese, chairman of the Department of Electrical Engineering, Ohio State University. It is expected that the directors of the Foundation will complete their organization of a comprehensive program at an early date.

In the words of President James F. Lincoln, in accepting the honor, "The sole purpose of this new Foundation is to challenge the attention of manufacturers whose products benefit society, and to stimulate the ingenuity of every engineer and skilled worker interested in extending the frontiers of knowledge and achievement."

Art of Pressure Casting Receives Expert Attention

By D. E. Flinchbaugh

York Chapter—At the meeting on Nov. 11 the capable chairman of the Membership Committee, George O'Neill, announced that the chapter has exceeded its all time high in membership.

The Entertainment Committee then announced the chapter's annual Oyster Bake in December.

Col. Samuel Price Wetherill, president of the Wetherill Engineering Co., spoke on the subject of Pressure Casting.

The Colonel explained the art of pressure casting in a very expert and thorough manner. His talk aroused great interest among the members, and led to a lengthy discussion on the subject.

Columbium and Titanium Used in Stainless Steel

By B. L. McCarthy

Buffalo Chapter—On Nov. 12 the Chapter was favored by a splendid talk on stainless and corrosion resisting steels by Russell M. Franks, research metallurgist of the Union Carbide and Carbon Research Laboratories.

Mr. Franks covered the development of the uses of columbium to control intergranular corrosion in austenitic steels of the 18-8 type, and the use of nitrogen in perfecting the plain high chromium steels.

He also discussed the use of titanium and columbium in controlling the air hardening characteristics of the plain chromium steels.

The economic value of stainless steel was discussed and the need of these steels explained.

Honored by Company

James F. Lincoln, President of Lincoln Electric Co., in Whose Honor the New James F. Lincoln Arc Welding Foundation Has Been Established.

Krivobok Delights Pitt Chapter With Talk on Stainless

Emphasizes Importance of Slow Solution Rate of Carbides

By G. R. Fitterer

Pittsburgh Chapter—In his own inimitable way, Dr. V. N. Krivobok, Research Laboratory, Allegheny Steel Co., described the current and new theories of stainless steel at the meeting on Oct. 8.

His delightful spontaneity in emphasizing his points is known to audiences the country over and it is hardly necessary to state that his talk was thoroughly enjoyed by all.

Krivobok emphasized that the slow rate of solution of the complex carbides in stainless steels, even at high temperatures, was an important factor that should always be taken into consideration.

The effects of some of the elements added to chromium stainless steel were described.

The impact strength decreases sharply at about 18% chromium but this factor may be overcome by proper processing of the material.

Nickel increases the hardenability up to 1% and higher additions are only slightly more effective.

Silicon improves the corrosion resistance at high temperatures.

A new development involving the use of 3% tungsten with 12 to 14% chromium gives a steel with high creep strength, unattainable in other stainless steels.

A non-hardening high ductility material (12 to 14% Cr) for welding is prepared with 0.25 to 1.0% aluminum. Its maximum hardness is only 170 Brinell, and its high ductility is a distinct advantage in certain installations.

Nitrogen from 0.007 to 0.102% increases the ultimate strength from 64,000 to 90,000 psi.

In discussing the corrosion resistance of stainless steels, Krivobok pointed out that the properties of the passive film on the surface are highly important.

For example, the film should be thin but ductile and above all, adherent and continuous. It has been determined that the passive film on a 12% chromium steel contains approximately 80% Cr_2O_3. It is important to note the higher ratio of alloy oxide in the film than alloy in the metal.

Krivobok illustrated his talk with a discussion of electrolytic potential and showed how this increased with chromium content to a maximum at 12%, thus explaining why truly stainless steels should contain chromium of at least 12%.

Stainless is always an interesting subject in Pittsburgh as evidenced by the lively discussion of Dr. Krivobok's talk. The speaker is noted for his dexterity in repartee and added much vivacity to the discussion.

Reports New Data on Gas Atmospheres

Gillett Covers Existing Methods And New Developments

By Adolph O. Schaefer

Philadelphia Chapter — There's no magic in the date of Dec. 4, so the credit for attracting the largest group of the infant season belongs to Dr. H. W. Gillett of the Battelle Memorial Institute.

Certainly those present were fortunate to hear a thorough review of existing methods of atmospheric control in furnaces, with a most important consideration of recent developments and new data.

Atmospheric Control Not New

Atmospheric control in furnaces is not entirely a new development. We have long had so-called "box annealing," and salt baths. We have also utilized gases for carburizing and nitriding.

The newer developments are the perfection of bright annealing, the demand for clean hardening of high carbon steels, and the avoidance of decarburized skins in springs or on cutting edges.

Mill problems are usually on a large scale—so much so that different atmospheres can be developed for different problems. But for smaller shops a more universal or foolproof atmosphere is needed.

Even the smokiest flame ("reducing," in the terms of the combustion engineer) may be oxidizing to steel. Many things have been tried, such as soot burners to throw soot on the work, but no open flame entirely avoids scaling.

Nitrogen Would Be Best

Pure nitrogen would probably be the best atmosphere except that it is difficult to obtain without contamination by a little air. Hence some reducing gas is usually added.

Interesting slides showed all types and kinds of furnaces used with atmospheric control. The results of considerable experimentation on various analyses of gases were an important feature of the talk.

A study of the reactions of the various gases found in furnace atmospheres demonstrated the difficulty in finding perfectly inert conditions.

The dinner preceding the meeting was addressed by Dr. W. Stuart Carnes on "The Lost Art of the Damascus Sword Blade Rediscovered."

No doubt other chapters have heard Dr. Carnes' Talk, and witnessed his remarkable demonstrations. They were new to the Philadelphia Chapter, and were thoroughly enjoyed by everybody.

Wheelco Opens Detroit Office

The Wheelco Instruments Co. of Chicago has opened a Detroit office located at 6432 Cass Ave., Detroit, Mich., with James A. Harrison, engineer, in charge as district manager.

History of Nickel Is Introduction to Enlightening Talk

Nickel Satisfies Exacting Needs Of Radio Tube Elements

Buffalo Chapter—John W. Sands addressed the Dec. 10th meeting on "The Properties and Selection of Alloy Steels."

The discussion centered chiefly on the origin and growth of alloy steels, the reasons for the number of S.A.E. specifications, and the necessity for balancing numerous factors in order to make the proper selection.

The choice of a steel for a given application is naturally dependent upon the performance and properties desired. Frequently, the ordinary physical property charts will indicate that more than one of the commercial alloy steels will meet a given set of strength, ductility and impact test requirements and the selection is then dependent upon other factors in which the price per pound of steel is balanced against fabrication, machining and treatment costs, the ease of reproducibility and the spoilage or risks in the required processing technique.

The selection of a steel should be based largely on the cost of the finished parts where a degree of interchangeability is encountered in providing the required performance or properties.

Uniformity, distortion, fatigue, and lower critical temperatures which eliminate wear and tear on furnaces were also discussed.

Mr. Sands is a member of the Development and Research Division, The International Nickel Company, Inc., and is a member of the Executive Committee of the New York Chapter of the Society.

The meeting was held at the Hotel Buffalo and was preceded by a dinner and coffee talk.

Acker Compares Old and New Methods for Brass Melting and Fabrication

By C. A. Mulligan

St. Louis Chapter—Speaker on the occasion of the Dec. 18th meeting, held as usual at the York Hotel, was M. W. Acker, director and general sales manager of the Brass Specialty Divisions of the Western Cartridge Co.

Mr. Acker spoke on "Non-Ferrous Metals," and illustrated with pictures the methods of manufacturing brass from 1921 up to the present. He developed much interest in describing the old methods as compared to the new, beginning with the melting furnaces and the molded billet, and including the annealing furnaces and rolling mills.

One of the many interesting facts was the proper annealing of brass sheets for deep drawing, such as for ammunition shells, and automobile headlights.

This meeting was well attended by the Alton, Granite City, Woodriver and East Side members and guests, who drove through a raging blizzard to hear Mr. Acker.

Some of the boys were heard to say at the beginning of the meeting that they regretted having come out in such inclement weather. However, after hearing Mr. Acker's lecture, they expressed complete satisfaction and were mighty glad to have braved it.

A total of 150 members and guests were in attendance, making this the banner meeting thus far this season.

After the meeting refreshments were served to those desiring to remain.

Telephone Laboratory Research Bears Valuable Fruit Is Shown By Talk at Washington Meeting

Harris, Research Metallurgist, Tells About Cable Sheathing, Magnetic and Electrical Contact Alloys

By A. J. Dornblatt

Washington Chapter—In introducing Dr. J. E. Harris, research metallurgist, Bell Telephone Research Laboratory, at the meeting on Nov. 9, Chairman W. M. Corse stated that Dr. Harris's company has the largest research appropriation of any American industrial organization.

That such a liberal policy bears valuable fruit was evident from the interesting talk made by Dr. Harris.

Dr. Harris discussed three types of alloys developed for telephone work, namely; cable sheathing alloys, magnetic alloys, and electrical contact alloys.

Requirements of Cable Sheathing

The principal requirements for cable sheathing alloys are: extrudability at a temperature too low to char the paper used for insulation; sufficient pliability for bending into position, say about 4500 psi. tensile strength; corrosion resistance; sufficient strength to be pulled through ducts; and, finally, and of vital importance, sufficient resistance to failure by fatigue.

These requirements limit the choice to lead-base alloys. Pure lead was first used, and then the 3% tin alloy was found very satisfactory except for a cost objection and possibly a restricted supply.

The 1% antimony alloy was a successful substitute and is generally used today.

Calcium Lead Introduced

Research has shown interesting possibilities for lead alloyed with 0.03% calcium. If field trials now under way substantiate laboratory tests this alloy may possibly replace the 1% antimonial lead.

Dr. Harris's slides showed the typical fatigue failure of lead cable caused by vibratory stresses, the failure apparently being intergranular. The agglomeration of antimony at the boundaries seems to accompany vibratory stresses.

It was shown that the presence of an intermetallic compound, Pb_3Ca, which possesses a diminishing solubility in lead as the temperature falls, makes the alloys of lead with about 0.03 or 0.04% calcium precipitation hardenable.

The alloy heated for 15 min. at 290° C. showed a tensile strength of 2000 psi. On precipitating the lead-calcium compound by aging 24 hr. at 20° C. and then 2 hr. at 100° C., the tensile strength rose to 7000 psi. This increase in tensile strength was not accompanied by a corresponding decrease in ductility.

Resists Fatigue Failure

This class of material has shown far greater resistance to failure under repeated or cyclic stress in laboratory tests than the conventional sheathing alloy.

Lead-magnesium alloys have been proposed for cable sheathing, but lacked atmospheric stability and had poor resistance to corrosion.

Tellurium lead, it was pointed out, may offer an advantage for cold-rolled material, but so far as is known does not offer such advantages in extruded cable sheath.

The magnetic alloys of interest in communication circuits are of two different types. The hard magnetic alloys require a large magnetizing force and retain their magnetism well; the soft magnetic alloys respond to a small magnetizing force and lose their magnetism readily.

Permalloy Is Soft Magnetic Alloy

Permalloy, 79% nickel, 21% iron, is of the latter class and a small magnetizing force produces a very large flux density.

For loading coil purposes Permalloy with small percentages of sulphur can be hot rolled readily at 1000° C. and then shattered, by rolling at a lower temperature, into bits that are readily pulverized. The pulverized material is coated with an appropriate insulating film and is then ready for use after pressing into rings and annealing.

For cable loading purposes and relays a low hysteresis alloy called Perminvar, of the iron-cobalt-nickel type, was developed. It is useful for continuous loading of submarine cable.

The Permendur alloy, 50% cobalt and 50% iron, also possesses unusual magnetic properties. It is very brittle except at elevated temperatures, and if it is to be cold worked, as for telephone diaphragms, 2% vanadium is added.

Special alloys, Dr. Harris explained, are required for electrical contact points. A New York city telephone subscriber's call may involve the operation of as many as 1500 pairs of precious metal contacts!

Platinum was originally used for contacts, but alloys are cheaper and generally better for resistance to wear. Where large currents are to be broken with small clearances the platinum group of metals tends to build up and bridge over. For such applications a 60% palladium, 40% copper alloy is used.

Precious Alloys for Contacts

For currents less than one ampere, a 69% gold, 6% platinum, 25% silver alloy is suitable. Palladium may be used in place of this when cheaper.

For vacuum tube sockets 70% gold, 30% silver is used. Silver plating is another method used to maintain good contact surfaces. Studies of the tarnish film on contacts are promising interesting developments.

Although Dr. Harris did not stress the part played by the Bell Laboratories in the development of these materials for improved communication, it is generally known that they played a major role.

Needless to say, Dr. Harris's talk was a reward to the large audience gathered to hear him.

ENGINEERING ALLOYS

NAMES • PROPERTIES • USES

by

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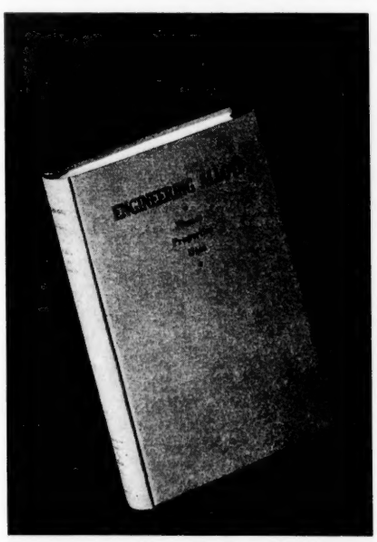

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SECTIONS 5, 6, 7 and 8.
Bibliography, unclassified alloys, and important conversion tables, definitions and miscellaneous information about metals and alloys.

Every important commercical alloy in the world—more than 8100 of them—is listed in this alloy encyclopedia. For the first time you may have at your fingertips the tradenames, the properties, the composition, the uses and the manufacturers of the important alloys you sometimes wish to buy or use—but upon which you wish greater details.

Five years of painstaking effort on the part of the authors and the alloy manufacturers has made this book a virtual alloy dictionary. Its six hundred pages are packed with alloy information—efficiently indexed and cross-indexed for easy referencce. If you buy or specify alloys, you should have this engineering tool on your desk. Or if you sell alloys, you will find this book a convenient reference to the makers and the characteristics of other alloys. It will give you the answers to your alloy problems.

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American Society for Metals

7016 EUCLID AVENUE **CLEVELAND, OHIO**

Minutes of Meeting of Board of Trustees

(Continued from page 4)

in January 1937. The sale of the book has been quite satisfactory.

Eight years ago the Secretary made certain proposals to the Board of Trustees with reference to the establishment of correspondence courses on the subject of metallurgy. The matter was discussed quite thoroughly at that time, but due to the inability of arriving at any satisfactory basis of operation the matter was permitted to drop.

However, I am very pleased at this time to again present the matter and its possibilities as a new field of service for the A.S.M.

Correspondence courses under the auspices of the A.S.M. would carry with them the prestige of the Society, and if properly organized and brought forward on the 1937 principles of education, should in turn add considerably to the prestige of the Society and help accomplish one of the functions of the Society to increase and disseminate information with reference to the metal arts.

With the exceptional amount of educational work being carried on by the chapters, it is logical that a large percentage of the present membership is already exposed to the educational germ and is availing itself of the opportunity.

However, there are countless numbers of individuals, many members of other societies, quite desirous of having additional information upon the subject of metals and who would probably relish the opportunity of taking a course in metals.

Correspondence Courses Suggested

There is a decided absence at the present time of suitable texts for metal teaching work inasmuch as most of the books dealing with metals have been written from an informational and collective standpoint.

One of the important factors which would contribute to the success of a course will be the ability of the student to enroll under the direction of an outstanding educator and a recognized authority on the particular subject being presented. The students' answers should be corrected by that authority, who should be compensated for his time and preparatory effort but who would give each student personal attention and constructive criticism.

The number of courses that might ultimately be developed for correspondence work is quite large, the principal problem involved being suitable texts.

If at a later time it is determined that the A.S.M. should proceed with correspondence instruction, it will at that time be possible to make investigations and determinations as to the proper subjects that should be offered, secure the best author, and request him to write the text to be used in that course.

While it is impossible at this time to present definite plans, rules and regulations, I did wish to secure from the trustees a request that I should continue further study and investigation of this important step, with the idea that when the general plan of the course has been more definitely matured, the matter could be presented to the Board for further consideration.

The request for further study was approved.

Howe Medal Rules Revised

Vice-President Waterhouse, chairman of the committee on revision of the rules governing the award of the Henry Marion Howe Medal, presented the revisions. The present rules are as follows:

1. The Board of Directors of the American Society for Steel Treating has established a fund to be known as the Henry Marion Howe Medal Fund, the proceeds of which shall be used annually to award a gold medal to be known as the Henry Marion Howe Medal.
2. This medal shall be awarded to the author of the paper which shall be judged to be of the highest merit. All papers in order to be considered must be published originally in the *Transactions* of the Society during the twelve months ending August 1st of the year in which the medal is awarded.
3. The competition for the Henry Marion Howe Medal shall be open to all.
4. The award shall be made by the Board of Directors.
5. The award may be withheld at the discretion of the Board of Directors.

Rules governing the selection of the Committee on Award of the Henry Marion Howe Medal are:

1. There shall be appointed by the President, not later than June 1st of the year in which the medal is to be awarded, a committee on awards consisting of two divisions, the first of which shall consist of 12 members, divided into four groups of three each, each group being located in adjacent territory to facilitate meeting.
2. Each group shall be assigned three monthly issues of the *Transactions* and it shall be the duty of each individual of each group to read carefully all of the papers published in the three assigned issues and to select the two papers which are, in his judgment, of the highest merit.
3. When each of the members of a group has made his selection, a meeting of all three shall be held and they shall select the two papers which, in the opinion of the majority, are of highest merit.
4. Each of the four groups having reached its decision in a similar manner, four sets of two papers each will have been selected for final review.
5. Each group committee shall report the papers selected by it to the President as soon as a decision is reached, but in any case not later than August 1st of the year in which the medal is to be awarded.
6. The second division of the committee shall consist of three individuals to whom shall be assigned the eight papers selected by the four group committees.
7. The second division of the committee shall decide which of the eight papers submitted to it is of highest merit, completing its work before September 1st, and sending its decision to the National President so that announcement and presentation of the Henry Marion Howe Medal may be made during the annual meeting.

Suggested revisions and additions are as follows:

Add to Rule 7:

If, in the opinion of the National President and the second division of the committee, no paper is considered of sufficient merit to deserve the award, then no award shall be made for that year.

Add to Rule 1:

Care shall be taken in selecting each group of the first division that individuals be chosen to represent (as far as possible) various divisions or branches of metallurgy. This shall also apply to the members of the second division.

Add to Rule 7:

In the case of a paper by joint authors, one or more of whom may have received the Howe Medal, this paper shall be considered along with the others. If found worthy of the award, the Medal shall be awarded to the author or authors not previously honored. In no case will the medal be awarded twice to the same man.

Upon motion by Treasurer Woodside, seconded by Trustee Ellis and unanimously carried, the report of the committee for revision of the rules of award of the Henry Marion Howe Medal was accepted.

The trustees then considered a number of miscellaneous items not covered in the agenda, upon which the following action was taken:

Vice-President Waterhouse, chairman of the Committee on Visual Education, presented a progress report stating the Committee was securing all available data and making a study of the possibilities and would be able to report at a later meeting of the board.

An addition was made to the Committee on Visual Education by the President, namely, Trustee R. L. Kenyon. The Committee now consists of G. B. Waterhouse (chairman), R. L. Kenyon and R. T. Bayless.

Upon motion by Secretary Eisenman, seconded by Vice-President Waterhouse and unanimously carried, the status of the Notre Dame Group was advanced from that of a group to a chapter.

Upon motion by Secretary Eisenman, seconded by Trustee Ellis and unanimously carried, authority was granted for a charter for a group to be formed at the Michigan College of Mining & Technology at Houghton, Mich., to be known as the Michigan College of Mining & Technology Group.

Conforming with a resolution adopted by a previous board of trustees, the following statement was read to the trustees:

"It is a tradition among members of the board of trustees of the A.S.M. that they are not to make recommendations or endorsements of candidates for officers of the Society."

Upon motion properly made, seconded and unanimously carried, the meeting adjourned.

Choice of Steel Is Dependent on Many Properties

Cost of Steel, of Treatment and of Fabrication Are Factors

By Walter Troy

Notre Dame Chapter—An enlightening history of nickel, disclosing the fact that the metal had been extensively used even before it was isolated, provided the introduction for "Nickel Alloys," an address delivered on Dec. 9 by E. M. Wise, assistant manager of the research laboratory of The International Nickel Co., Inc.

A Bureau of Mines motion picture, "The Production of Nickel," was used to illustrate this portion of the address.

Following this, one of the most exacting applications of nickel—to radio tube elements—provided plenty of material for the discussion by the speaker. A metal that satisfies the requirements of very close tolerance at high temperatures with very thin sections, such as for radio tube service, cannot but be respected.

The constitution and useful features of the nickel-iron alloys were then discussed and the composition ranges of importance were graphically presented. Special expansion properties, both high and low, and unique magnetic properties are found in this series.

The effect of adding chromium to the nickel irons was then illustrated and the composition ranges of the corrosion and heat resisting alloys were considered.

The nature and uses of the copper-nickel and copper-nickel-zinc alloys were then covered.

In discussing the hard silicon and aluminum-containing Monels and the nickel bronzes, it was brought out that the latter two alloys are particularly responsive to age hardening heat treatments. The major uses of these hard alloys are in fields where high yield strength and ultimate strength coupled with corrosion resistance are needed.

Mr. Wise's collection of slides evoked favorable comment from those present. Physical properties plotted against composition were generally on the same slide with the constitutional diagram of the system, one above the other. Thus, since equal abscissa scales were used, the attendance was favored by the highest ratio of intellectual penetration to mental effort that has visited Notre Dame in a long while.

'High Brow' Section Gets 'Low Down' on Corrosion

By A. J. Dornblatt

Washington Chapter heard a very interesting discussion of the properties of corrosion resisting steels presented by C. E. MacQuigg of the Union Carbide and Carbon Research Laboratories, Inc., at the Dec. 14th meeting.

His talk has been previously reviewed having been presented before the Columbus, Dayton and Cincinnati Chapters.

However, due to what the speaker called the "high brow" character of the local section's membership (where did the section get that reputation?) he did not hesitate to speak glibly of pH and concentration cell effects, and his talk was very illuminating to the 150 members present.

Mr. MacQuigg explained how the so-called "stainless" steels are more appropriately described as "corrosion resistant" steels. The nature of their resistance to corrosion and the mechanism of attack in corroding media were discussed.

The influence of special elements in enhancing certain properties was brought out, and attention was directed to the complex and varied factors of corrosion which must be taken into account in selecting an alloy for a specific application.

Typical applications were shown indicating the multitude of highly satisfactory fields for corrosion resisting steels.

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Complete Data On Centrifugal Casting Given

Process Invented by Brazilian Engineer About 1911, Not Developed Until 1925

By Gordon Sproule

Montreal Chapter—Centrifugally cast pipe was the subject of the second meeting of the season held Nov. 2 at the Windsor Hotel.

Between the dinner and lecture R. W. Mitchell, chief engineer, Pressure Pipe Co. of Canada, Ltd., showed and explained some films illustrating the manufacture and installation of centrifugally cast, reinforced concrete pipe. High pressure water pipe up to 90 in. in diameter has been made by this process.

The metallurgical lecture was given by Walter J. Langston, vice-president, Canada Iron Foundries, Ltd., on the manufacture of cast iron pipe by the centrifugal process.

History Traced

Going into the history of centrifugal casting, Mr. Langston explained that the process was invented about 1911 or 1912 by a Brazilian engineer, Delavaud. He came to the United States with the invention, but had no success until he went to Toronto about 1915.

Briefly, the process consists in feeding molten cast iron into a revolving horizontal metal mold, by means of a long spout which is withdrawn as a layer of the required thickness is built up in the mold. There is very little chilling effect and that is eliminated by an anneal.

The iron, consisting of a high silicon mixture, is melted hot in a cupola. It is desulphurized by Purite in a forehearth; alloys are not necessary. The proper amount of molten iron is put in a tilting ladle which feeds the spout.

Silicon "Smoke" Lines Mold

Precision means are provided to feed also a "smoke" of pulverized 80% silicon on the inside of the mold, ahead of the molten iron; this makes the chilling almost negligible, and only 3 oz. of silicon is used for a length of 6-in. pipe.

The mold spins at a rate to give about 2500 surface ft. per min. The molds are machined from forged nickel-chromium alloy steel and it is expected will turn out 12,000 to 15,000 lengths of pipe under the new process using silicon. They are surrounded by water at about 95° F.

Immediately after casting, the length of pipe is extracted and started through an annealing oven. Temperature at the in-going end is 1700° F. The pipe comes out after about 45 min., cools for a time in air, and is dipped in tar while still about 350° F.

60-In. Pipe Possible

Sizes now being made range from 4 to 30 in. diameter in 16-ft. lengths. It is expected to make 60-in. pipe in the near future.

In France the machines are semi-automatic and turn out 20-ft. lengths, 4 to 20-in. in diameter, and 9-ft. lengths down to 1⅞ in. in diameter. The same process is used for making cylinder liners for Citroen cars; these liners are nitrided to give a wear resistant surface.

The bell end of the pipe is formed by a core centered in the mold. Pipe can be made by this process with a flange at one end; in the "Sand-spun" process, in which the mold is lined with sand, flanges can be cast on both ends.

The pipe is, of course, much more perfect in form than that cast by standard methods in vertical sand molds. The fine-grained iron is of high tensile strength, and, for example, 6-in. pipe for 150 lb. pressure is only ⅞ to ¾ in. thick. This will actually withstand tests at 1500 to 2000 lb. pressure.

Research Was Key To Development of Die Casting Alloys

By E. V. Peterson

North West Chapter—The field of die castings from the dim past to the immediate present was thoroughly covered by D. L. Colwell of the Stewart Die Casting Corp. of Chicago on December 15.

D. L. Colwell

Research has been the key to the development of the modern alloys which assure good tensile properties, impact strength and permanence.

The influence of minor constituents has been determined by accelerated steam aging and ordinary temperature aging tests conducted by the A.S.T.M. Subcommittee on Die Castings formed in 1926. The results showed the necessity for the use of extremely pure zinc, and since 1929 several producers have made zinc of this quality available.

In particular, the tin and lead contents are very important. Tin is not permitted to exceed 0.05% and lead to exceed 0.07%.

Compositions and tests on the aluminum-base alloys were also covered thoroughly. The Chapter is indeed indebted to Mr. Colwell for his fine and interesting talk.

H. J. Kicherer of the membership committee proudly announced that our membership has now reached the 100 mark.

Announcement was made that the first lecture of the educational course will be given on Jan. 20 by W. I. Sweet on "Heat Treatment of Tool Steels," at the Minneapolis-Moline Power Implement Plant. The complete program will be announced later.

Gill Welcomed Eagerly On Seventh Appearance Before Chicago Chapter

By D. R. Howerton

Chicago Chapter—A record crowd battled the stiff wind of upper Michigan Blvd. to the Medinah Club on Nov. 12 for the monthly meeting of the Chapter.

A coffee talk following the dinner was given by E. J. Borden of the La-Salle Extension School on the subject of "Earning Power."

Technical Chairman Harry Hardwicke introduced the speaker of the evening, James P. Gill, chief metallurgist, Vanadium-Alloys Steel Co. Only formal introduction was necessary, this being the seventh time that Mr. Gill has addressed the Chapter—a record that speaks well of his outstanding ability as a speaker and his popularity with the Chicago members.

Mr. Gill presented to an interested audience the 1936 Campbell Memorial Lecture on "High Speed Steel," containing the results of an intensive study of the 18-4-1 type of high speed steels.

Those who heard this lecture at the Metal Congress welcomed the occasion to hear it again. For those who were not there the lecture served as a fine opportunity to hear it.

Corrosion Explained

Conditions Favorable to Development of Corrosion Discussed

By C. W. Horack

Golden Gate Chapter—The October meeting was held in the ball room of the Whitecotton Hotel in Berkeley. Following the usual dinner a few announcements were made by Chairman Howard A. Kelty.

V. J. Minner, chairman of the Program Committee, then introduced the speaker of the evening, F. L. LaQue of the International Nickel Co.

His subject, "The Corrosion of Metals," proved to be very interesting and instructive. Most of us hear a good deal about corrosion and its destructiveness, but do not always recognize the conditions which are favorable to its development.

Mr. LaQue first discussed some of the physical properties of metals and the fundamental chemical reactions involved in the process of corrosion.

Following this introductory review, the speaker described and illustrated by means of slides many examples of the different forms of corrosion. The use of various kinds of metals and other methods of resisting the progress of corrosion were discussed.

At the conclusion of the talk many questions on all sorts of corrosion problems kept the speaker busy for some time. All agreed that an important but not too well understood subject had been very ably discussed.

Acknowledgment

The New Jersey Chapter wishes to extend through the medium of THE REVIEW *its appreciation for the receipt of affiliated chapter programs and yearbooks, all of which have been placed at the disposal of its members who travel from city to city.*

Sanitary Ware Is Discussed

Hayes Pays Tribute to Steel Men for Improvements in Manufacture

By F. J. Comerford

Rochester Chapter—A record-breaking attendance of members and guests heard Dr. Anson Hayes, director of research, American Rolling Mill Co., talk on "Processing, Drawing and Enameling of Formed Sanitary Equipment" on Oct. 12.

Dr. Hayes started off his talk by paying a great tribute to those responsible for improvements in the manufacture of steels required for formed sanitary equipment.

A series of well-prepared slides traced the history of both the old and new types of steels and their manufacturing methods. Photomicrographs were used to indicate the anneal necessary to give the proper grain size for good deep drawing qualities.

Dr. Hayes explained that very low carbon steels have the best deep drawing properties and that fine-grained steels give extreme ductility while coarse-grained steels are softer but not so ductile.

Made Crucible Distributor

Railway & Power Engineering Corp., Ltd., Montreal, has been appointed exclusive distributors for the Crucible Steel Co. of Canada, Ltd., of their complete line of high speed and tool steels, alloy, machinery and Rezistal stainless steels.

Offices and warehouses are located at Toronto, Montreal, Sydney, Hamilton, Winnipeg, and Vancouver.

A. F. McLachlin, vice-president of Railway & Power Engineering Corp., is a member of the A.S.M.

Metals Studied From Service Angle at Phily

Course of Six Lectures Will Be Practical in Nature

By Adolph O. Schaefer

The Philadelphia Chapter has just announced a Special Evening Course of six lectures entitled "Metals—How They Behave in Service."

The course is the work of a committee headed by Assistant Professor A. W. Grosvenor of Drexel Institute, and will begin Jan. 21.

It is hoped that these lectures will approach the study of metals from a new and different standpoint—from a consideration of what goes on inside metals while they are subjected to the various conditions met with in service.

The talks comprising the series will be practical in nature, and will not be based directly on laboratory tests. As an outcome of the discussions, however, there will be developed an understanding of the causes of various failures, and an appreciation of the value of certain laboratory tests.

The objects of Philadelphia's Special Evening Course are several. First, it is desired to give the members annually a chance to review the fundamentals of their science; second, the opportunity is furnished younger members and beginners to get an understanding of the groundwork of metallurgy; and, third, it is hoped that the Special Evening Course will increase the appreciation of the regular monthly technical meetings.

The speakers have been carefully chosen for their knowledge of the subject, and their ability to handle fundamentals clearly.

Employment Service

Address answers care of A. S. M., 7016 Euclid Ave., Cleveland, unless otherwise stated

Positions Wanted

YOUNG MAN: Age 23, Case graduate, Chemical Engineer. More than one year's experience in a large manufacturing plant as assistant in chemical and metallurgical departments. Excellent heat treating experience. Willing to change location. Box 1-5.

EXECUTIVE: In manufacturing field, with good experience and a working knowledge of metallurgy. 32 years old, graduate of General Motors Institute of Technology. Background of toolmaking and tool designing, cold heading, galvanizing and heat treating of production and tools. Box 1-10.

CASE GRADUATE: 27 years old, 2½ years chemical plant experience, 2½ years sales engineering. Desires opportunity in steel sales, primarily tool steel, or chemical equipment including industrial furnaces. Box 1-15.

FOUNDRY METALLURGIST with considerable experience in analytical and laboratory work, heat treatment and trouble shooting, alloy irons and foundry sands, would like position as chief metallurgist and chemist with opportunity for advancement. Box 1-20.

METALLURGIST: 8 years experience in plant heat treatment and control. Knows steel mill, tractor, and locomotive problems. Now employed. Box 1-30.

HEAT TREATER and Tool Hardener: 4 years of metallurgical college. Experienced all-around heat treater and tool hardener. Specialized in gas carburizing and metallography. Box 1-35.

WELDING ENGINEER: Technical graduate with eight years experience in arc welding, research development, design and commercial welding applications. Seven years with one of largest manufacturers of arc welding equipment. Box 1-45.

Positions Open

MAN with some experience in the construction of industrial furnaces to take charge of shop and to supervise installation in the field. Give all details and salary expected in first letter. Box 1-25.

STEEL SALESMAN to cover Cleveland territory. Between ages of 30 and 40. Some experience in selling tool steels desirable. Salary and expense basis. Box 1-40.

Special Types of Atmospheres for Furnaces Wanted

Variety of Gas Analyses and Furnaces Revealed

By F. J. Comerford

Rochester Chapter—R. J. Cowan, research metallurgist, Surface Combustion Corp., substituted for E. G. deCoriolis, director of research for the same company, at the meeting of Nov. 9 and gave a very interesting and well-illustrated talk on "Recent Applications of Controlled Atmosphere."

The speaker congratulated the Rochester Chapter for being so fortunate as to have such a splendid meeting place as the University of Rochester.

Mr. Cowan began his talk by stating that over 75% of the requests received by his company today involve the use of some special type of atmosphere control for bright annealing steel and other purposes.

In discussing the various methods for carburizing, Mr. Cowan proved by means of slides that CO gases produce excessive carbon diffusion, while methane gases produce a high carbon concentration. A combination of CO and methane gives the best results.

Slides showing all kinds of atmosphere controlled furnaces and an explanation of the various types and chemical analyses of gases proved that Mr. Cowan's opening remarks were more than true—this is the day of special applications.

Mr. Cowan's capable and unassuming manner in handling his subject made all those present feel at ease in bringing up their problems. If questions are a criterion of an interested group, this meeting was surely a great success.

18-4-1 Is Still Popular

High Speed Steel Talk Accompanied by Film of Quenching Process

By Walter M. Saunders, Jr.

Rhode Island Chapter—The Dec. 2nd meeting was exceptionally well attended, about 100 being present at the Providence Engineering Society rooms.

The principal speaker was Norman I. Stotz, metallurgical engineer, Universal-Cyclops Steel Corp., who talked on "A Present Day Picture of High Speed Steels."

Professor I. N. Zaverine came down from M.I.T. to show his high speed film "The Quenching Process," and prefaced the showing by calling attention to the interesting parts of the film, by lantern slides. It is a remarkable picturization of quenching, and should be seen by all chapters that can obtain it.

Mr. Stotz devoted considerable time to compositions of high speed steels, and with each one indicated the field of use. While one type works well in certain applications, no hard and fast rule may be laid down for the type to use in every case, as so many factors affect the performance.

The impression was gained, however, that the 18-4-1 type is still the most popular, with the newer molybdenum, low tungsten steels forging ahead rapidly.

Addresses of Chapter Secretaries

BALTIMORE CHAPTER
Paul Lane, American Hammered Piston Ring Co., Baltimore, Md.

BOSTON CHAPTER
H. E. Handy, Saco-Lowell Shops, Biddeford, Maine.

BUFFALO CHAPTER
B. L. McCarthy, Wickwire Spencer Steel Co., River Road, Buffalo, N. Y.

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W. G. Bischoff, 307 Linwood Ave., Canton, Ohio.

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Hugh E. Brown, W. S. Tyler Co., 3615 Superior Ave., Cleveland, Ohio.

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Harry Green, Diamond Chain & Mfg. Co., Indianapolis, Ind.

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E. C. Black, The Midvale Co., 219 S. Central Ave., Los Angeles, Calif.

MICHIGAN COLLEGE OF MINING AND TECHNOLOGY GROUP
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Miss B. W. Brownrigg, P. O. Box 371, Station H, Montreal, P. Q., Canada.

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T. N. Holden, 1219 Glenwood Rd., Brooklyn, N. Y.

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Alexis Caswell, Manufacturers' Association of Minneapolis, Minneapolis, Minn.

NOTRE DAME CHAPTER
Walter C. Troy, 401 Walsh Hall, Notre Dame, Ind.

ONTARIO CHAPTER
L. F. Fitzpatrick, Flexible Shaft Co., Ltd., Toronto, Ont., Canada.

PENN STATE GROUP
D. F. McFarland, Pennsylvania State College, State College, Pa.

PEORIA CHAPTER
L. E. Roark, P. O. Box 765, Peoria, Ill.

PHILADELPHIA CHAPTER
Adolph O. Schaefer, The Midvale Co., Nicetown, Philadelphia, Pa.

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H. L. Walker, Box 6621, N. S. Sta., Pittsburgh, Pa.

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Carl G. Peterson, Providence Gas Co., Providence, R. I.

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Irving C. Matthews, Eastman Kodak Co., Rochester, N. Y.

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Alan Mattison, Mattison Machine Works, Rockford, Ill.

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TRI-CITY CHAPTER
Robert H. Lind, Peoples Light Co., Davenport, Iowa.

WASHINGTON CHAPTER
George A. Ellinger, National Bureau of Standards, Washington, D. C.

WORCESTER CHAPTER
Carl G. Johnson, Worcester Polytechnic Institute, Worcester, Mass.

YORK CHAPTER
Chas. M. Strickler, % General Machine Wks., York, Pa.

CHAPTER CALENDAR

DATE	CHAPTER	PLACE	SPEAKER	SUBJECT
Jan. 18	New York	Third Floor, International Bldg., Rockefeller Center	R. A. Wilkins	Copper and Brass
Jan. 19	Saginaw Valley	Bancroft Hotel, Saginaw, Mich.	H. S. Austin	Automotive Cast Iron
Jan. 19	Schenectady	Van Curler Hotel	A. O. Schaefer	Large Forgings
Jan. 21	Canton-Mass.	Hotel Onesto	F. N. Speller	Corrosion
Jan. 21	Chicago	People's Gas Bldg.	H. B. Knowlton	Inspection and Testing
Jan. 21	New Haven	Seven Gables Inn, Milford, Conn.	J. C. Hodge	Welding and Weld Testing
Jan. 21	Rockford	Nelson Hotel	K. H. Hobbie	Heat Resisting Alloys
Jan. 28	Chicago	Engineering Bldg.	M. W. Dalrymple	Properties of Tool Steel
Jan. 29	Philadelphia	Engineers Club	Everett Chapman	Metallurgy of Welding
Feb. 1	Cleveland	Cleveland Club	R. F. Mehl	Diffusion in Alloys
Feb. 1	Mahoning Valley	Tod Hotel	E. E. Thum	Controlled Atmospheres
Feb. 3	Rhode Island	Providence Engineering Society		Alloy Steel Movie
Feb. 4	Chicago	People's Gas Bldg.	R. L. Templin	Physical Testing
Feb. 4	Worcester	Worcester Polytechnic Institute	H. J. French	Alloy Steels
Feb. 5	Boston	M.I.T. Room 5-330	J. J. Christie	Commercial Brasses and Bronzes
Feb. 5	Lehigh Valley	Hotel Traylor, Allentown, Pa.	T. H. Nelson	Stainless Steels
Feb. 5	Ontario	Royal York Hotel, Toronto	G. B. Waterhouse	Metallurgical Progress
Feb. 8	Baltimore	Engineers Club		Aircraft Materials
Feb. 8	Detroit	Hotel Fort Shelby	Harold Austin F. H. Driggs	Automotive Cast Iron Special Elements in the Automotive Industry
Feb. 8	New Jersey	Essex House, Newark	E. R. Johnson	Modern Automotive Materials
Feb. 8	Peoria		A. G. Forrest	Steel Making
Feb. 8	Rochester	Chamber of Commerce	E. C. Bain	Low Alloy Structural Steels
Feb. 8	Washington	Garden House, Dodge Hotel	F. P. Zimmerli	Springs and Spring Steel
Feb. 9	Columbus		J. H. Friedman	Hot and Cold Upsetting
Feb. 9	Hartford	Hartford Electric Light Co. Auditorium	C. M. Loeb, Jr.	Molybdenum in Iron and Steel Industry
Feb. 9	North West	Minnesota Union, University of Minn.	Adam M. Steever	Drop and Hammer Forgings
Feb. 9	Schenectady	Keelers Restaurant, Albany, N. Y.	Enrique Touceda	Centrifugal Casting
Feb. 9	Syracuse	Onondaga Hotel	H. A. De Fries	Corrosion Resistant Steels
Feb. 10	Dayton	Engineers Club	J. H. Friedman	Hot and Cold Upsetting
Feb. 10	Notre Dame	Engineering Bldg.	R. G. McElwee	Cast Iron
Feb. 10	York	Gettysburg College	B. L. Lewis	Testing Materials
Feb. 11	Buffalo	Hotel Buffalo	John A. Gann	Magnesium and Its Alloys
Feb. 11	Chicago	Medinah Club	E. E. Thum	Controlled Atmospheres
Feb. 11	Cincinnati	Alms Hotel	J. H. Friedman	Hot and Cold Upsetting
Feb. 11	Los Angeles	Griffith Planetarium		Inspection Trip
Feb. 11	Muncie	Muncie, Ind.	O. K. Parmiter	Tungsten Carbide Tools
Feb. 11	Pittsburgh	Roosevelt Hotel	E. R. Darby	Bearing Metals
Feb. 15	New York	Third Floor, International Bldg., Rockefeller Center	G. J. Comstock	Powder Metallurgy
Feb. 15	Tri-City	Rock Island Arsenal, Rock Island, Ill.		Joint Meeting with Foundrymen
Feb. 16	Saginaw Valley	Durant Hotel, Flint, Mich.	O. N. Peterson	Metallurgical Control of Automotive Steels
Feb. 18	Chicago	People's Gas Bldg.	H. F. Moore	Fatigue of Metals
Feb. 18	New Haven	Hammond Laboratory, Yale University		Discussion Meeting
Feb. 19	Boston			Party
Feb. 19	St. Louis	York Hotel	V. N. Krivobok	Workability of Stainless Steels
Feb. 25	Milwaukee	Elizabethan Room, Milwaukee Athletic Club.	E. W. Page	X-Rays and Radiography
Feb. 26	Philadelphia	Engineers Club	N. L. Mochel	Physical Testing
Mar. 1	Cleveland	Cleveland Club	D. K. Crampton	Non-Ferrous Developments
Mar. 1	Mahoning Valley	Tod Hotel	E. C. Bain	Reaction Rates
Mar. 3	Rhode Island	Providence Engineering Society	P. M. McKenna	Cemented Carbides
Mar. 4	Chicago	People's Gas Bldg.	E. F. Davis	Metallurgical and Heat Treating Furnaces
Mar. 4	Worcester	Worcester Polytechnic Institute	Mr. Esua	Quenching of Steels
Mar. 5	Boston	M.I.T. Room 5-330	P. M. McKenna	Cemented Carbides
Mar. 5	Lehigh Valley	Hotel Traylor, Allentown, Pa.		Annual Dinner Meeting
Mar. 5	Ontario	Royal Connaught Hotel, Hamilton	O. W. Boston	Machinability of Metals
Mar. 8	Baltimore	Engineers Club		Tool Steels
Mar. 8	Detroit	Hotel Fort Shelby	J. A. Dow R. J. Cowan	Atmosphere Control Atmosphere Control
Mar. 8	New Jersey	Essex House, Newark	C. H. Bierbaum	Bearing Metals
Mar. 8	Peoria		T. B. Bechtel	Fuels and Furnaces
Mar. 8	Rochester	Room 208, Engineering Bldg., University of Rochester	T. L. Taylor	Working Characteristics of Cold Drawn Steels
Mar. 8	Washington	Garden House, Dodge Hotel	N. P. Goss	X-Rays in Steel Treating
Mar. 9	Columbus		H. J. French	Hardening Phenomena
Mar. 9	Hartford	Hartford Gas Co.	J. A. Gann	New Developments in Magnesium
Mar. 9	North West	Minnesota Union, University of Minn.	J. F. Lincoln	Electric Welding
Mar. 9	Syracuse	Onondaga Hotel	T. H. Nelson	Comparison Between Welder, Melter and Heat Treater
Mar. 9	Tri-City	Rock Island Arsenal	D. A. Campbell	Gas Furnaces
Mar. 10	Dayton	Engineers Club	H. J. French	Hardening Phenomena
Mar. 10	York	York	A. M. Candy	Arc Welding
Mar. 11	Buffalo	Hotel Buffalo	N. F. Tisdale	Molybdenum
Mar. 11	Cincinnati	Alms Hotel	H. J. French	Hardening Phenomena
Mar. 11	Los Angeles		H. Gamel	Non-Ferrous Metals
Mar. 11	Pittsburgh	Roosevelt Hotel	S. L. Hoyt	Gases in Steel
Mar. 12	Chicago	Medinah Club	L. F. Reinartz	Open Hearth Practice
Mar. 15	New York	Third Floor, International Bldg., Rockefeller Center	A. A. Hassan	Permanent Magnet Steels